FOOD MANUFACTURE
Incorporating Food Industries Weekly
...HILL LIMITED, STRATFORD HOUSE, 9 EDEN STREET, LONDON, N.W.1 SEPTEMBER 1, 1954

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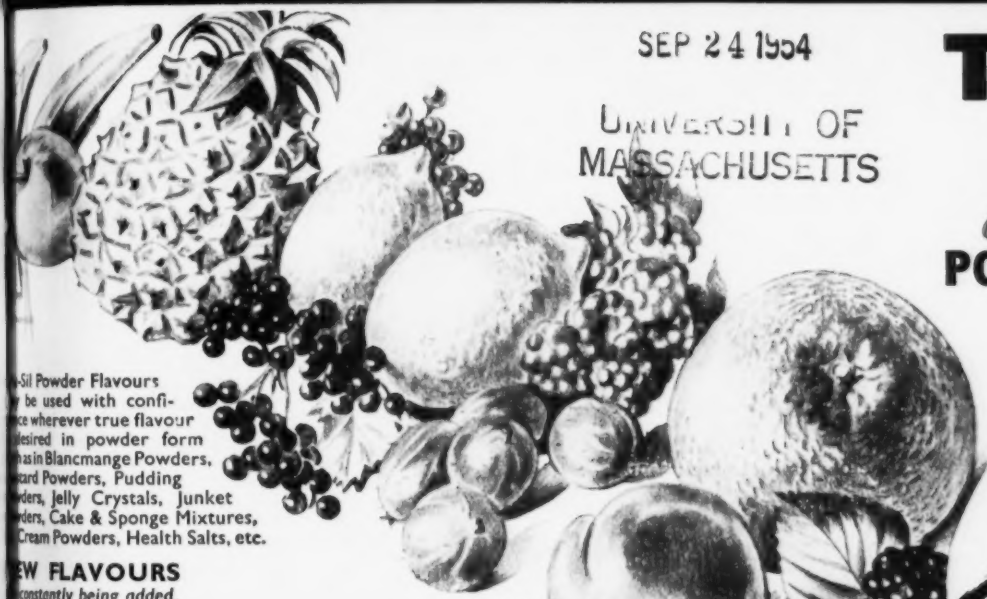

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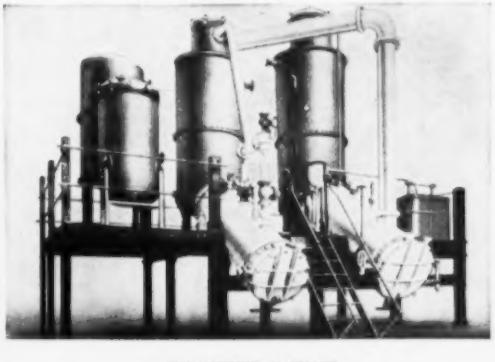

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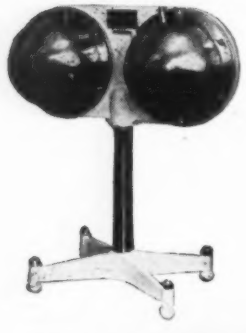

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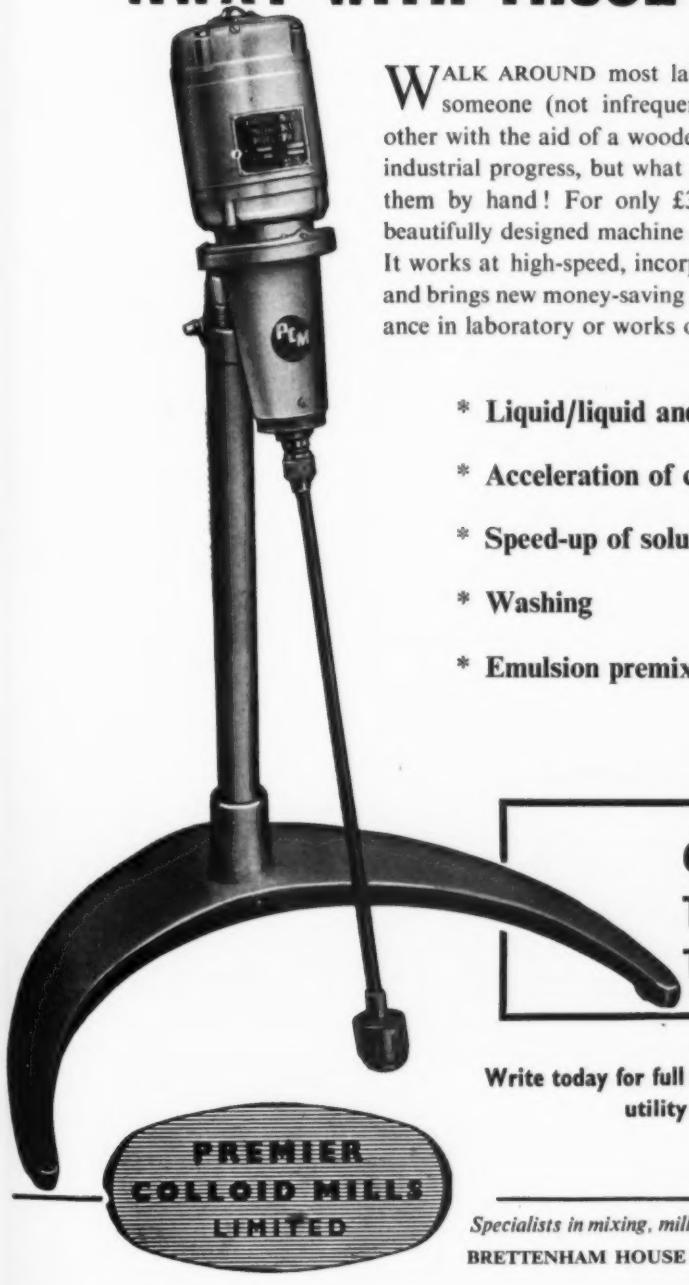

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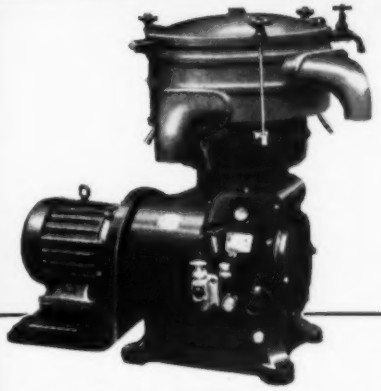

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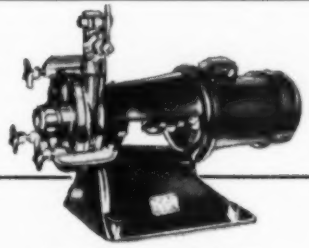

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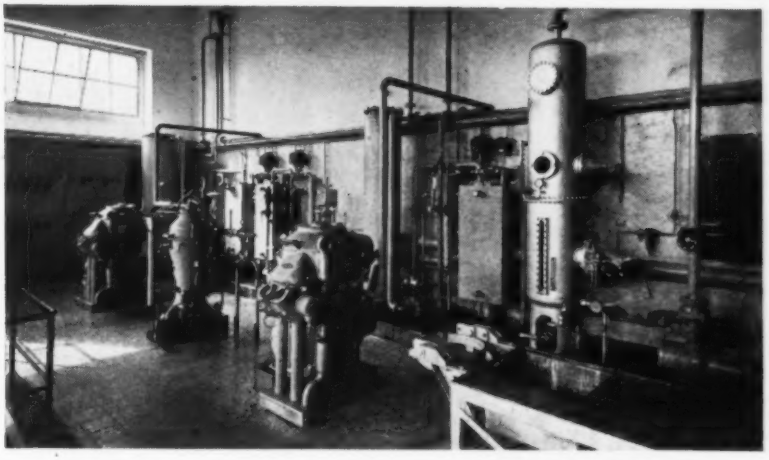

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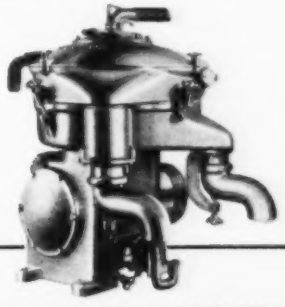

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For the continuous 2-way and 3-way separation of liquids and solids. Capacities up to 6,000 g.p.h. of liquids containing higher percentages of solids.

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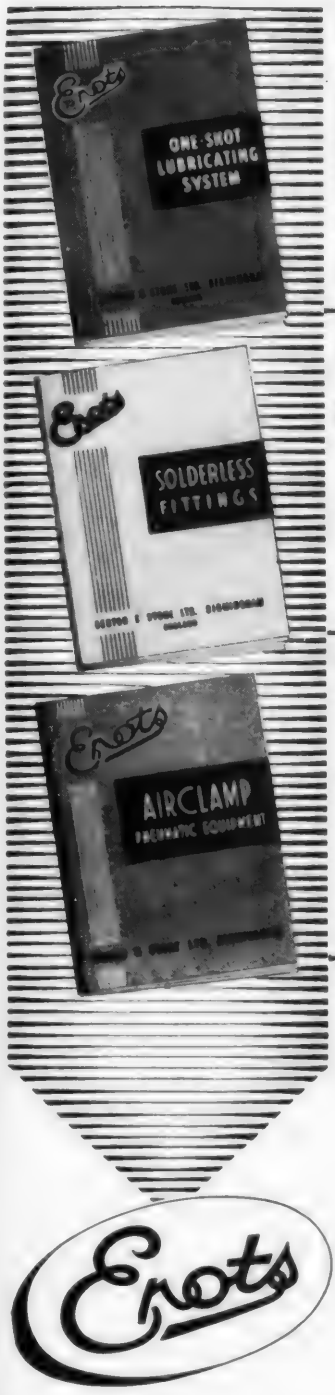

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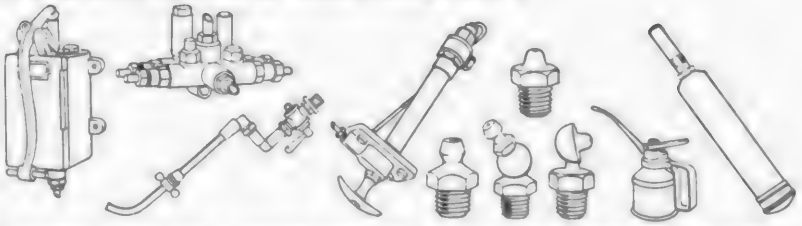

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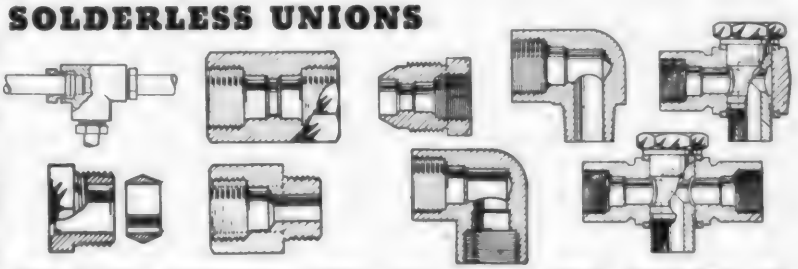

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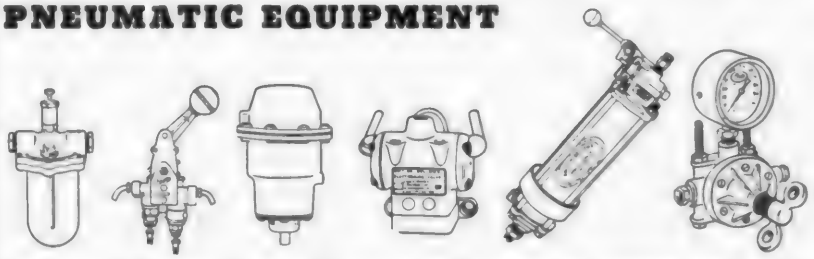

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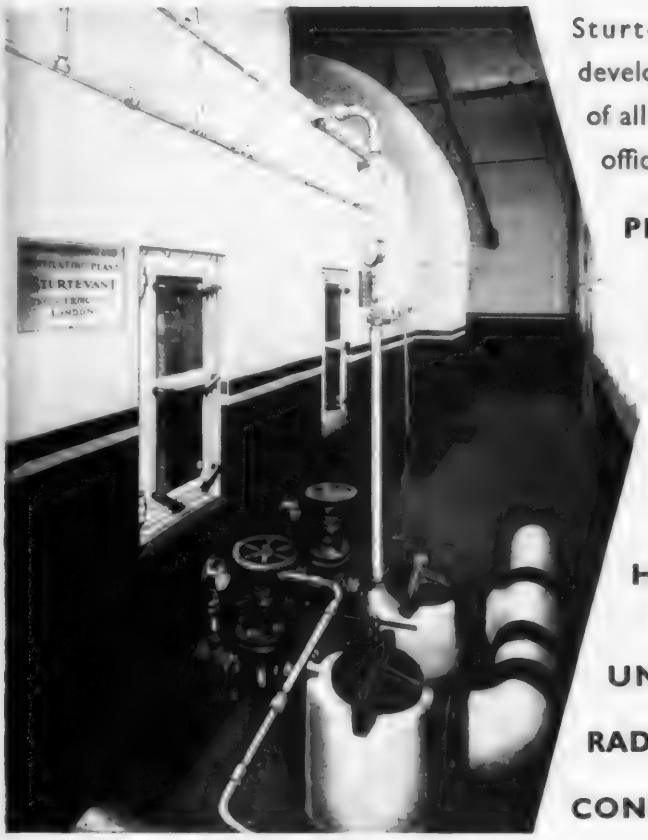

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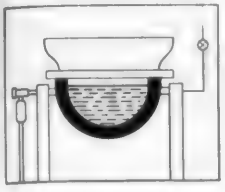
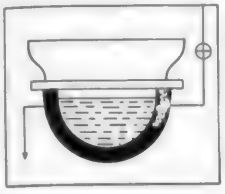
When the air in steam spaces isn't got out properly

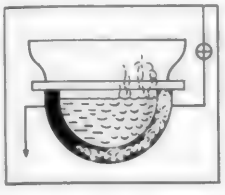
this is what happens—



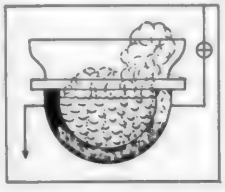
BEFORE STEAM ENTERS. The steam space is full of air. As it is the worst possible conductor of heat, the air must be rapidly discharged as soon as steam comes in, otherwise boiling will be uneven and output slow.



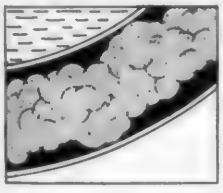
STEAM TURNED ON. Entering steam forces the air down and round the jacket. Some air can get out through the steam trap (if one is fitted and it is the right type for the pan), but it may not get out quickly enough.



AIR POCKETS FORM. The air that cannot get out is forced into pockets. The air pockets have a drastic cooling effect and at these points the steam-heat has great difficulty in getting through to the stuff in the pan.



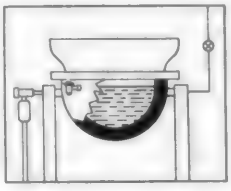
STEAM CONDENSES —AIR CANNOT. Some of the air is mixing with the steam, reducing the effective steam temperature accordingly and so reducing the temperature head between steam and pan contents. The air cannot condense and has no useful heat to give.



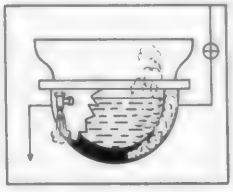
INSULATING FILM. As the air cannot condense it spreads over the steam surface of the pan. This heat-resisting layer slows down seriously the rate of heat transmission. Uneven boiling; delayed production loses several batches in a day's working.

When the air in steam spaces is vented AUTOMATICALLY

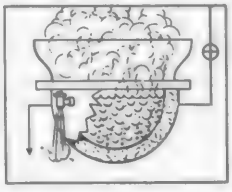
this is what happens—



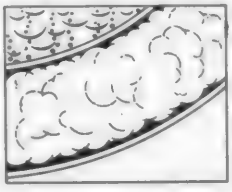
BEFORE STEAM ENTERS. The difference between the situation in this picture and in the picture opposite is that the jacket is fitted (at a point remote from the steam inlet) with a temperature-sensitive Automatic Air Vent. Now see what happens:



STEAM ON, AIR BLOWING. Entering steam forces the air down and round the jacket. The Automatic Air Vent is wide open and discharging air full bore. The Vent will close against pure steam, after the air has gone.



NO AIR POCKETS. Virtually no air remains to dilute the steam or obstruct the flow of heat. No time at all is lost in bringing up the pan to temperature, evenly, for every fresh start.



RAPID HEATING. There is now maximum effective steam temperature, rapid transmission or heat from the steam to the stuff in the pan, uniform heating all round the pan, minimum time taken with the batch.

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P.S. *Having illustrated steam-jacketed pans (as an example of what happens in many kinds of steam-heated process units) we are prepared for some pan users to say "Yes, but we use neither steam traps nor air vents: we use drilled plug cocks and they blow the air out beautifully". Our answer to that is "Why blow an enormous amount of steam to waste when the correct steam trap and automatic air vent will give all the pan output you want for a sensible steam consumption?"*

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To SPIRAX-SARCO LTD.
CHELTENHAM, Glos.

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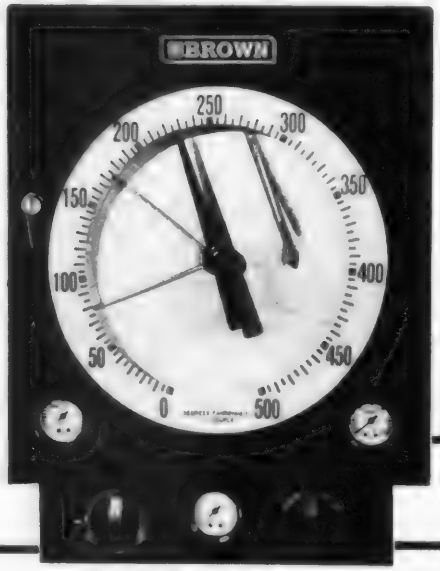

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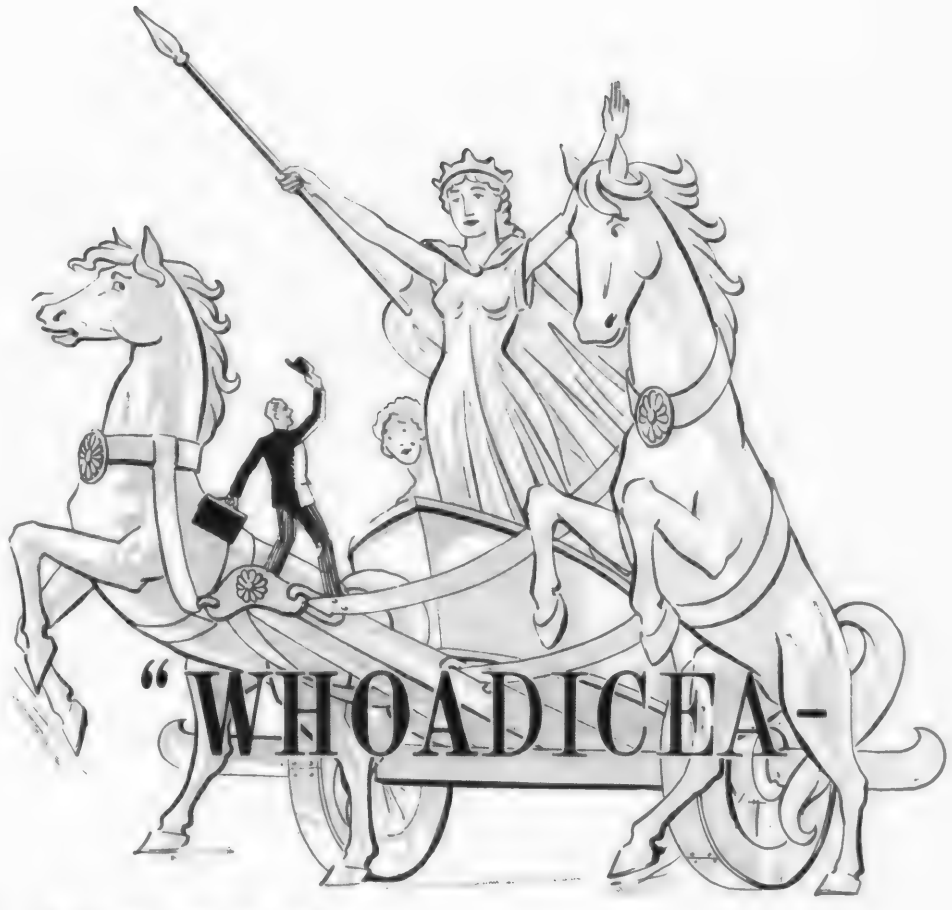

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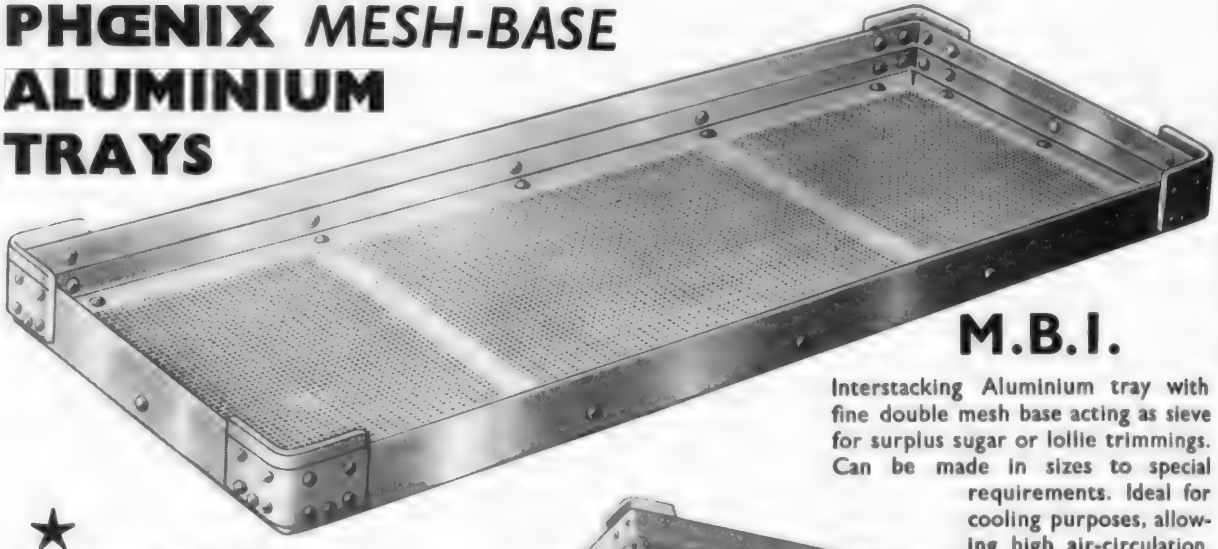

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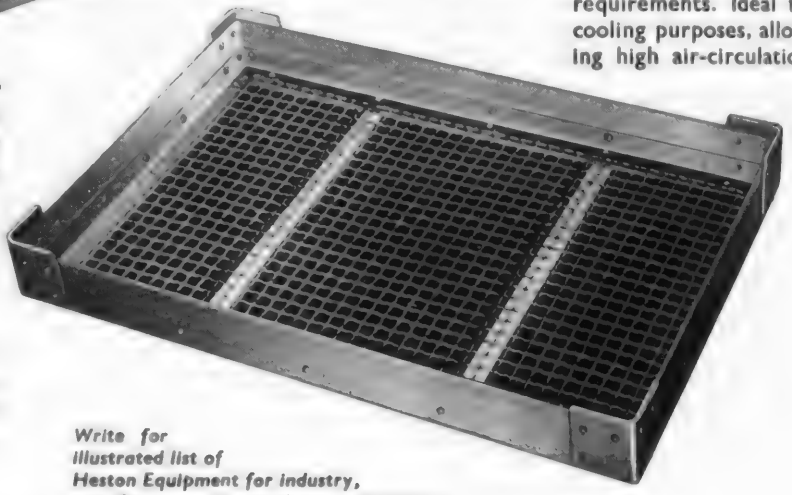

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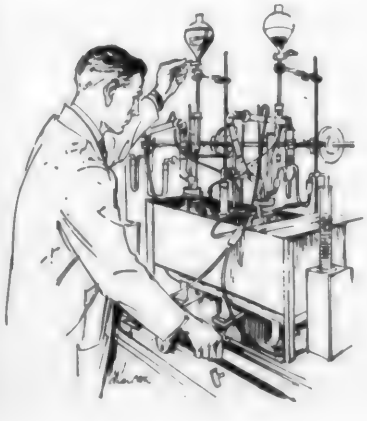

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The entry of British Cellophane Limited into the field of transparent packaging marked an era of development which has since brought immeasurable benefits to manufacturers of a wide variety of products in Britain and the world over.

The tremendous success of "Cellophane" with its superlative transparency as a sales medium, rapidly made its use universal, the trade mark a household word and British Cellophane Limited the leading manufacturers of cellulose film in the U.K., in Europe and the Commonwealth.

The widespread usage of "Cellophane" has given British Cellophane Limited a fund of experience in flexible packaging second to none—a fund which through the medium of the Company's highly qualified scientists and technicians is constantly being applied to the successful solution of the packaging problems of British Industry.

Since the war the Company's experience, skills and resources have been applied to the production of other packaging films—all of the same high standard of quality as the world-famous "Cellophane"—and associate companies have been formed all over the world. This rapid and assured expansion goes on, with increasing benefits to all manufacturers who wish to develop their own potential through better transparent packaging.

BRITISH CELLOPHANE LIMITED

Sales Offices: 12/13, CONDUIT STREET, LONDON, W.1.
Reg. Offices and Factory: BATH ROAD, BRIDGWATER, SOMERSET.

"Cellophane" is the registered trade mark of British Cellophane Limited and denotes the brand of cellulose film manufactured by them.

'INSULIGHT' lightens labour

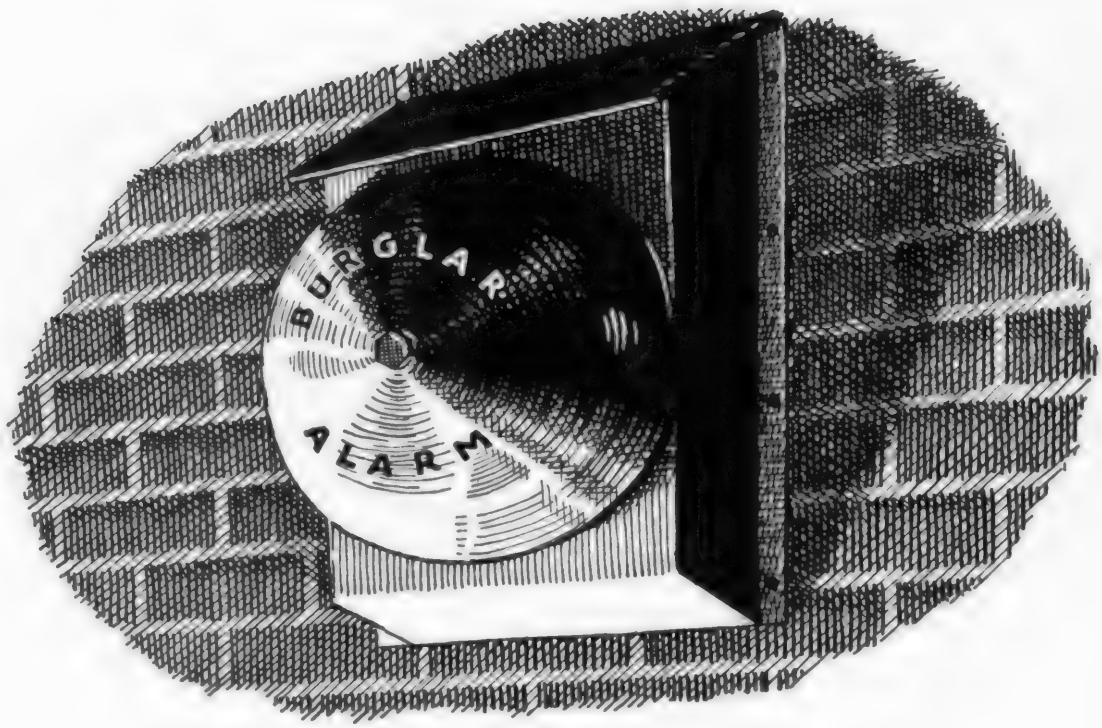
"INSULIGHT" Hollow Glass Blocks transmit light to the dark heart of a building or a room, diffusing it over wide areas, in places where ordinary glazing would be undesirable. They cut the racket of the factory, the roar of traffic to a subdued murmur. In places where hygiene is essential, their smooth hard surface is easily cleaned. They hold warmth in and cold out. They keep private places private. In fact, "INSULIGHT" Hollow Glass Blocks do the work of walls—but walls of light.

'INSULIGHT' HOLLOW GLASS BLOCKS

PILKINGTON BROTHERS LIMITED

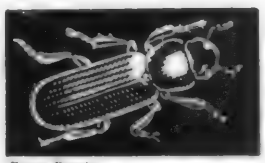
FOR FURTHER INFORMATION ON THE USE OF GLASS IN BUILDING, CONSULT THE TECHNICAL SALES AND SERVICE DEPT., ST. HELENS, LANCS. (TEL: ST. HELENS 4001) OR SELWYN HOUSE, CLEVELAND ROW, ST. JAMES'S, LONDON, S.W.1 (TEL: WHITEHALL 5672-6). SUPPLIES ARE AVAILABLE THROUGH THE USUAL TRADE CHANNELS. "INSULIGHT" is a registered trade mark of Pilkington Brothers Limited.

HGB 17



THE ALARM WILL NEVER RING

for these thieves!



Flour Beetle
(Actual size approx. 4 mm.)

Cacao moth larva
(Actual size approx. 11 mm.)

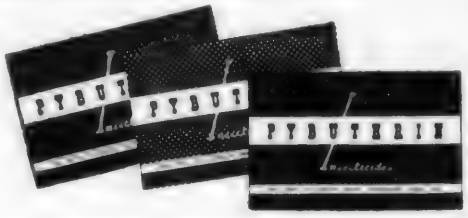
You know the destructive powers of insects; you know the value of cleanliness; but you may still be robbed by voracious pests unless you take further effective counter-action.

A "Pybuthrin" Insecticide is the answer

PYBUTHRIN is a mixture of piperonyl butoxide and pyrethrins. It is the active principle of a range of potent, easily applied insecticides, which are safe to use in the presence of foods, yet produce a much greater kill than preparations containing an equivalent amount of pyrethrins alone. Different formulations and methods of application may be required for different insects and circumstances. Write for a copy of the booklet listed below which applies to *your* business.

"Pybuthrin" Insecticides for :— **1** *Pests of Cereals & Cereal Products.* **2** *Pests of Bacon & Ham.* **3** *Pests of Cocoa Beans, Chocolates, Nuts, etc.*

PYBUTHRIN



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Give for those who Gave

THOMAS BROADBENT & SONS LTD HUDDERSFIELD ENGLAND

THOMAS BROADBENT & SONS LIMITED

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When you require to measure bulk or batch quantities of edible liquids, oils, spirits and solvents, hot or cold water, we can supply meters with summating, resettable, electrical presettable, direct reading or pointer type index attachments (as illustrated) and control equipment.

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INDUSTRIAL **LIQUID** *METERS*

(A COMPANY OF THE PARKINSON & COWAN GROUP)

MEASUREMENT LTD. HYDRAULICS DIVISION
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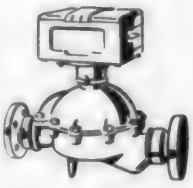
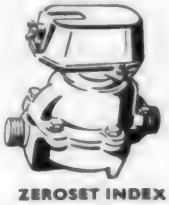
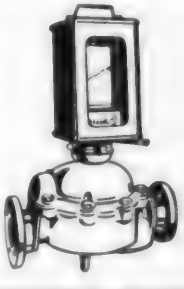


BOX TYPE COUNTER
Re-settable batch-dispensing counter with 7-digit cumulative total register.

6" VERTICAL RE-SETTING INDEX
Can also be used to pre-set a determined quantity, with electric trip to operate solenoids, pumps, warnings, etc.



ZEROSET INDEX
Simple turning motion re-sets indicator to zero.



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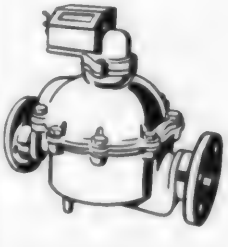
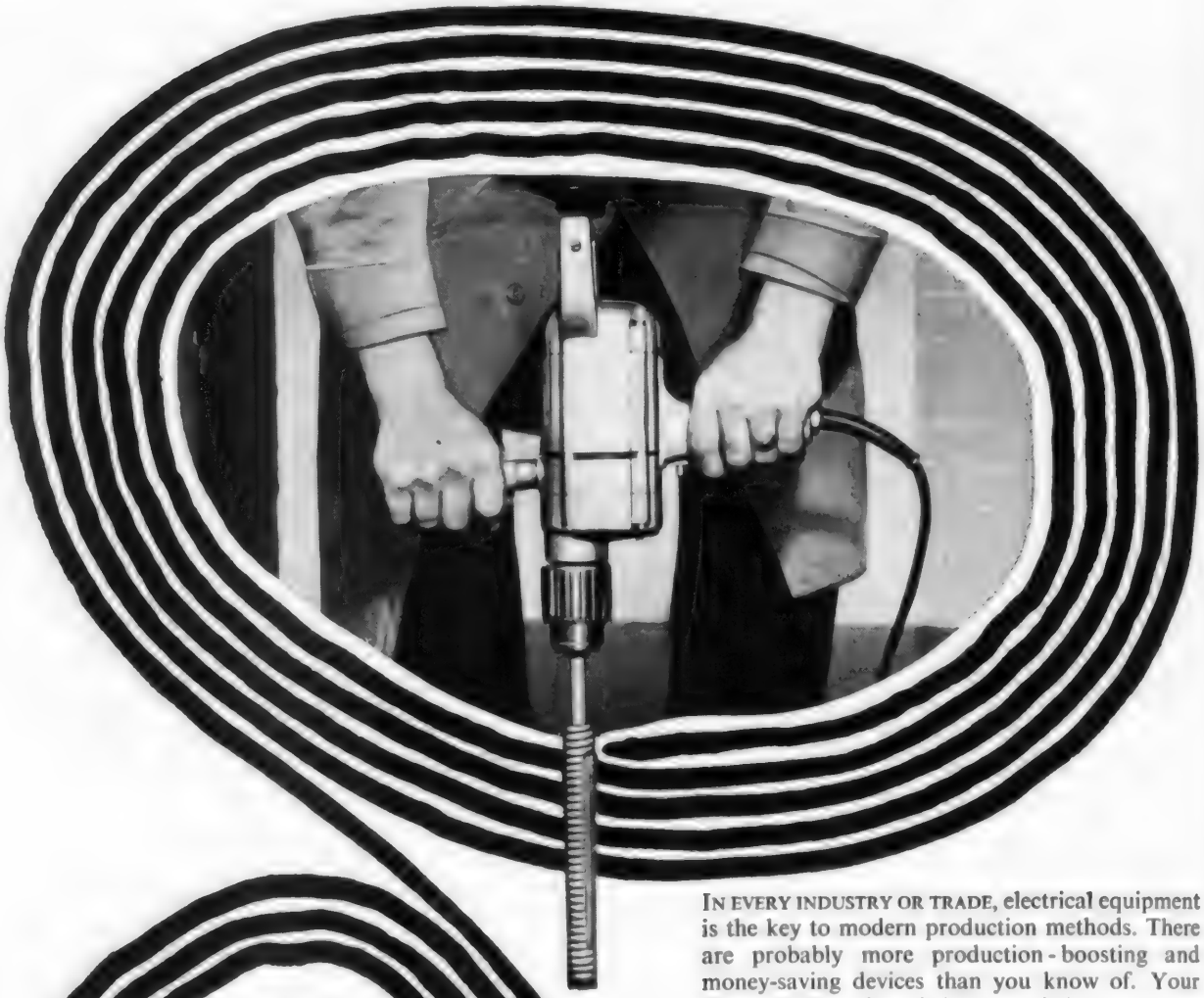
Gives a graphic record on 5" x 12" chart; suitable for 4 hour, 8 hour, 1 day, 7 day periods



PREDEX CONTROLLER
Automatic means for continuous dispensing of fixed quantities of liquids.

Having a hand in Productivity



Drilling for—Rag Bolts!

It sounds strange. But most of us have seen a rag bolt even if we haven't recognised it. Machinery on a concrete floor, bolted down. The bolts embedded in the concrete are rag bolts. In the old days it was a case of a man with hammer and chisel—laboriously and slowly chipping the concrete until the holes were large enough and deep enough. Now one man takes an electric drill, and drills *the holes; just like that. (Productivity!) Faster? Fifty times—a hundred! But the electric drill is ONLY ONE OF THE MANY AIDS TO PRODUCTIVITY THAT ELECTRICITY CAN BRING YOU.*

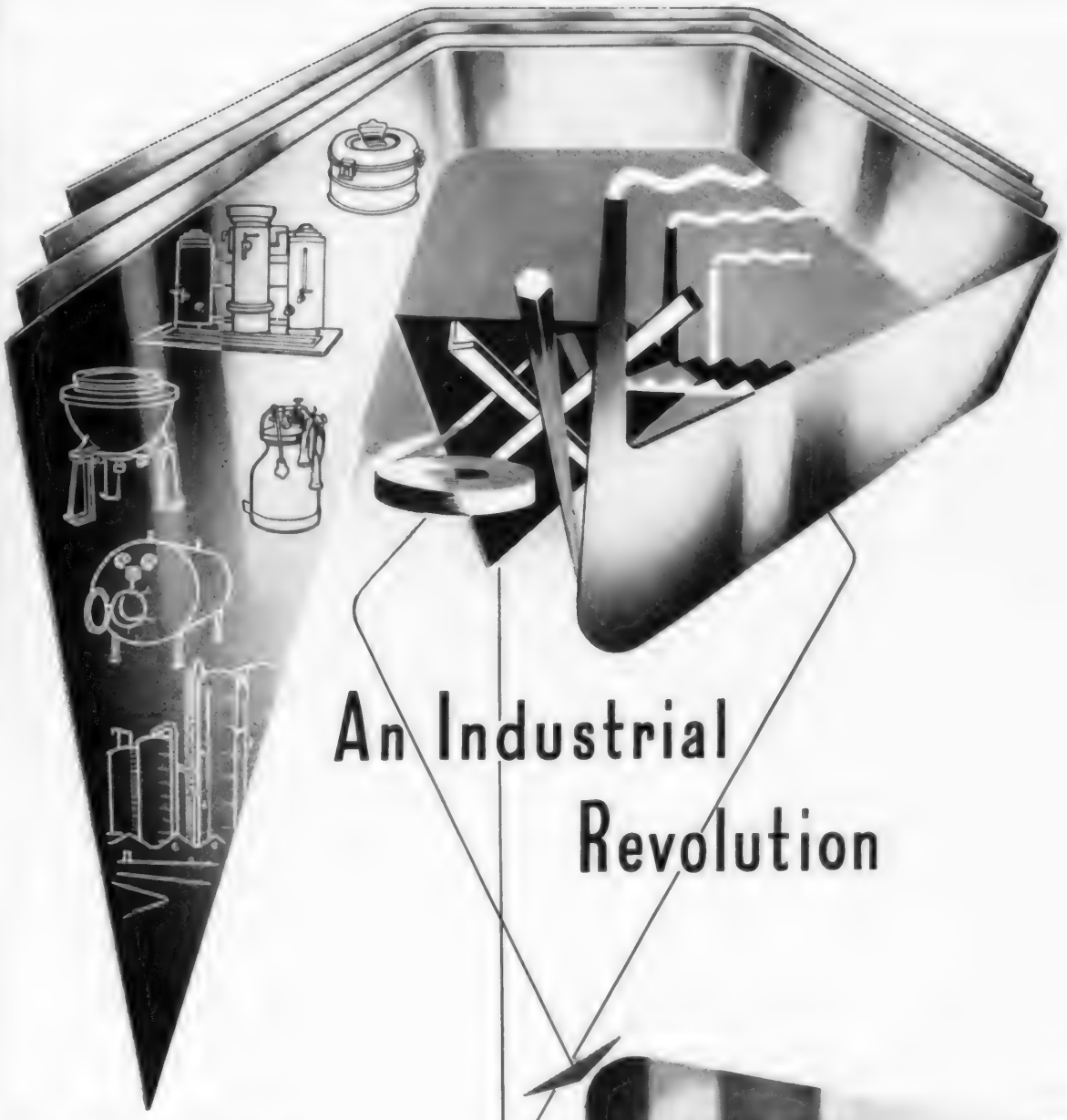
The British Electrical Development Association
2 Savoy Hill, London, W.C.2.

IN EVERY INDUSTRY OR TRADE, electrical equipment is the key to modern production methods. There are probably more production-boosting and money-saving devices than you know of. Your Electricity Board can help you and give you sound advice.

They can also make available to you, on free loan, several films on the uses of electricity in Industry—produced by the Electrical Development Association.

E.D.A. are publishing a series of books on "Electricity and Productivity". Four titles are available at the moment; they deal with Higher Production, Lighting, Materials Handling, and Resistance Heating. The books are 8/6 each (9/- post free) and the Electricity Boards (or E.D.A. themselves) can supply you.

Electricity
a Power of Good for PRODUCTIVITY



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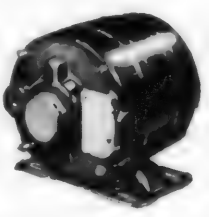
Busy Bees and Bottlenecks

Have you a bee in your bonnet about bottle-necks? Many people have, because they don't use the G.E.C. busy bee "Fractionals" to keep things moving and production on the up-grade.

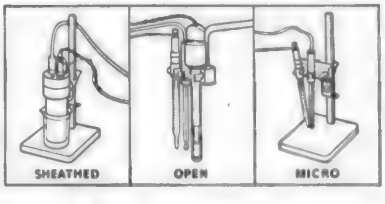
G.E.C. Fractionals



THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Ask users about the

PYE pH METER
AND MILLIVOLTMETER
DIRECT READING — MAINS OPERATED



Electrode Kit to make up all the assemblies illustrated and all necessary accessories are supplied complete with the instrument.

Many leading industrial laboratories are using the Pye Universal pH meter and millivoltmeter to their complete satisfaction. Read what The British Aluminium Company Limited says:

". . . we write to inform you that our recommendations for the purchase of a number of these equipments for use in our Routine Laboratories have been accepted. You can expect, therefore, within the next week or so to receive orders from a number of our factories. . . . We feel you would like to hear from us this tangible proof of how satisfactory we found your instruments."

Signed: Director of Research.

May we send you details of this and other instruments in our comprehensive pH range ?

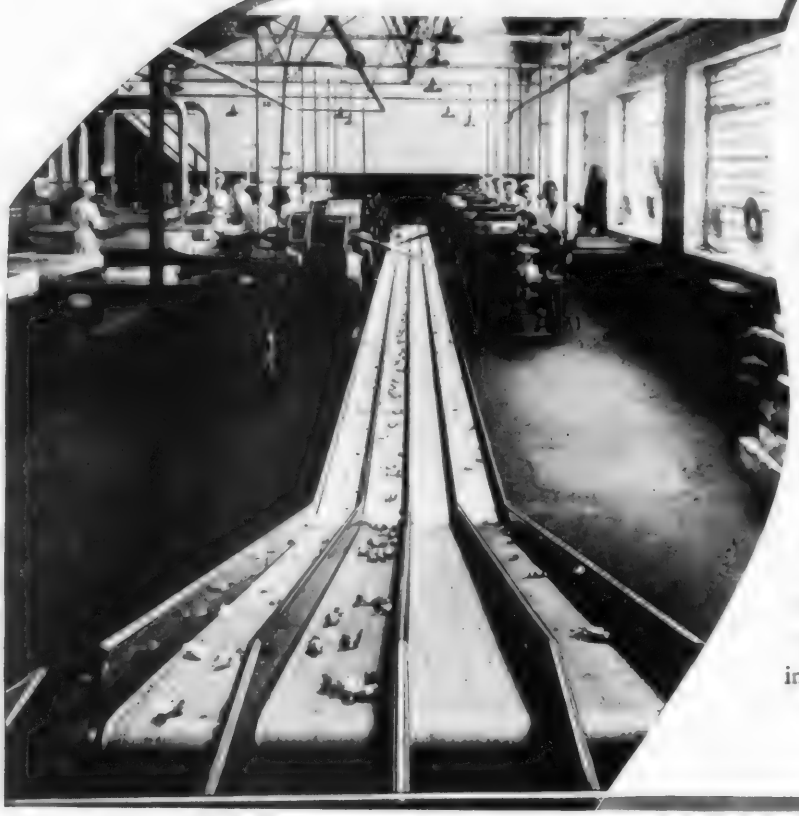
STANDARD EQUIPMENT IN MANY LEADING LABORATORIES

SCIENTIFIC PYE INSTRUMENTS

W. G. PYE & CO. LTD., GRANTA WORKS, CAMBRIDGE, ENGLAND

WG.50

Break that bottleneck!



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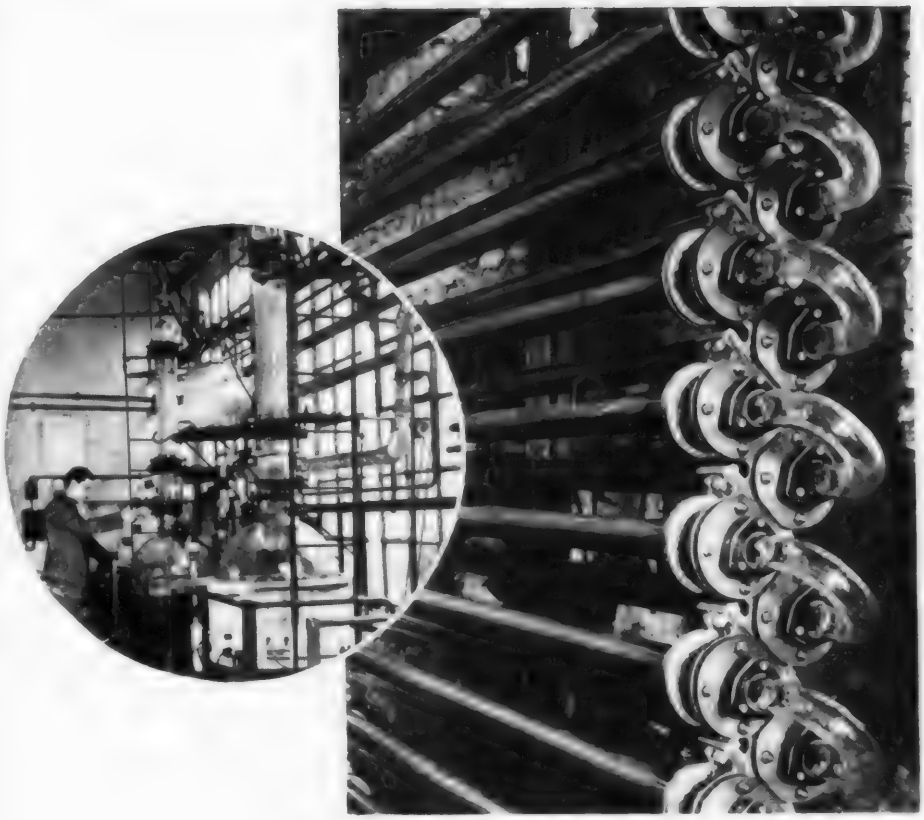
Jenner Conveyors KEEP THINGS MOVING

A. & C. JENNER LTD. *Specialists in Mechanical Handling Equipment.* CLARENDON WORKS · MITCHAM · SURREY. Telephone MITCHAM 4044/5



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Our experts are at your disposal upon any phase of the application of glass to any manufacturing problems

Free yourself of corrosion.

Give yourself visual control of what you make and infinitely better facility for cleaning.

"Quickfit" industrial plant and Visible Flow "Pyrex" brand pipeline combine to make complete all-glass manufacturing units.

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We've cleaned up here

The advent of the electrical washing machine meant quite a call on our fractional motor division. Today, thousands of housewives not only in Britain but all over the world are sitting back in comfort whilst Crompton Parkinson gets busy with the weekly wash. And the same robustness, reliability and efficiency that is sending millions of unmentionables to flap on the drying line in thousands of homes each week is available to all manufacturers of machinery who deal in small horsepowers.

When it comes to FRACTIONAL H.P. MOTORS . . .

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for the
FOOD
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The remarkable covering power of **PATTINSON'S LIGHT MAGNESIUM CARBONATE** *(one gramme having a surface area of 35 square metres)* has resulted in its increasing use in the salt industry, to promote free running by the dual action of separating adjacent salt crystals and by absorbing filamentary water.

Our Sales Technical Department would be very pleased to advise on the uses of this chemical in any powdered product where free running qualities are desirable.

THE WASHINGTON CHEMICAL CO. LTD.

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is to take natural products which have a flavour or aroma or both; extract from them the principles responsible for that flavour and aroma, and then prepare these principles in such a form as to be easily and conveniently and economically used by our customers.

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Produce clean secondary steam

WITH

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GENERATORS

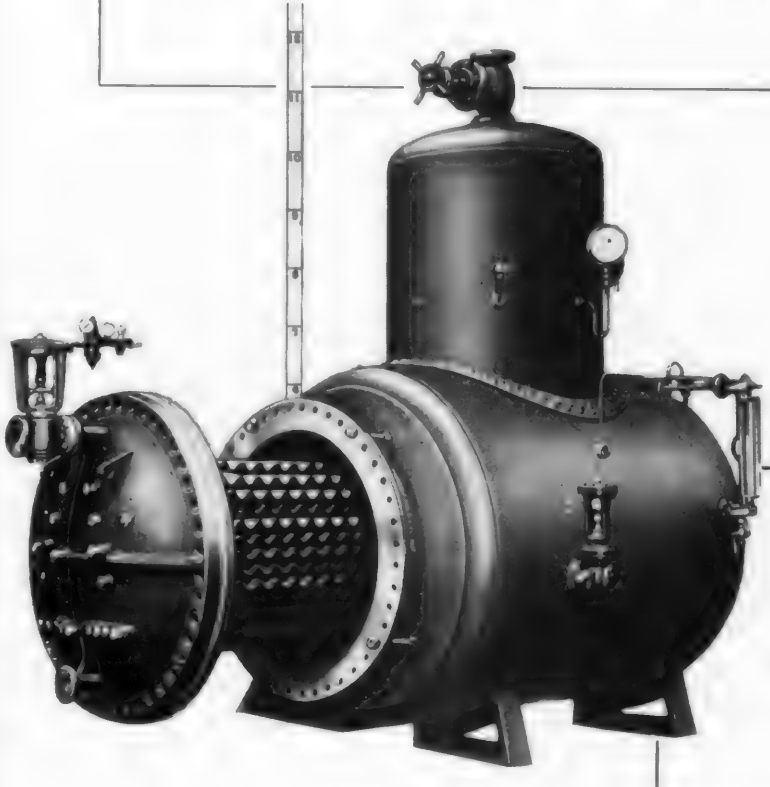

Illustration *shows a Generator designed to generate 7,000 lbs. of steam per hour at a pressure of 120 p.s.i. using as the primary heating medium, steam at a pressure of 300/350 p.s.i. and temperature 750° F.*

Each Generator designed by specialists to meet the conditions applying in each particular case. Heating medium may be steam or high pressure hot water. "Double Efficiency" of the indented tubes, forming the heating surface, ensures compactness. Operation fully automatic.

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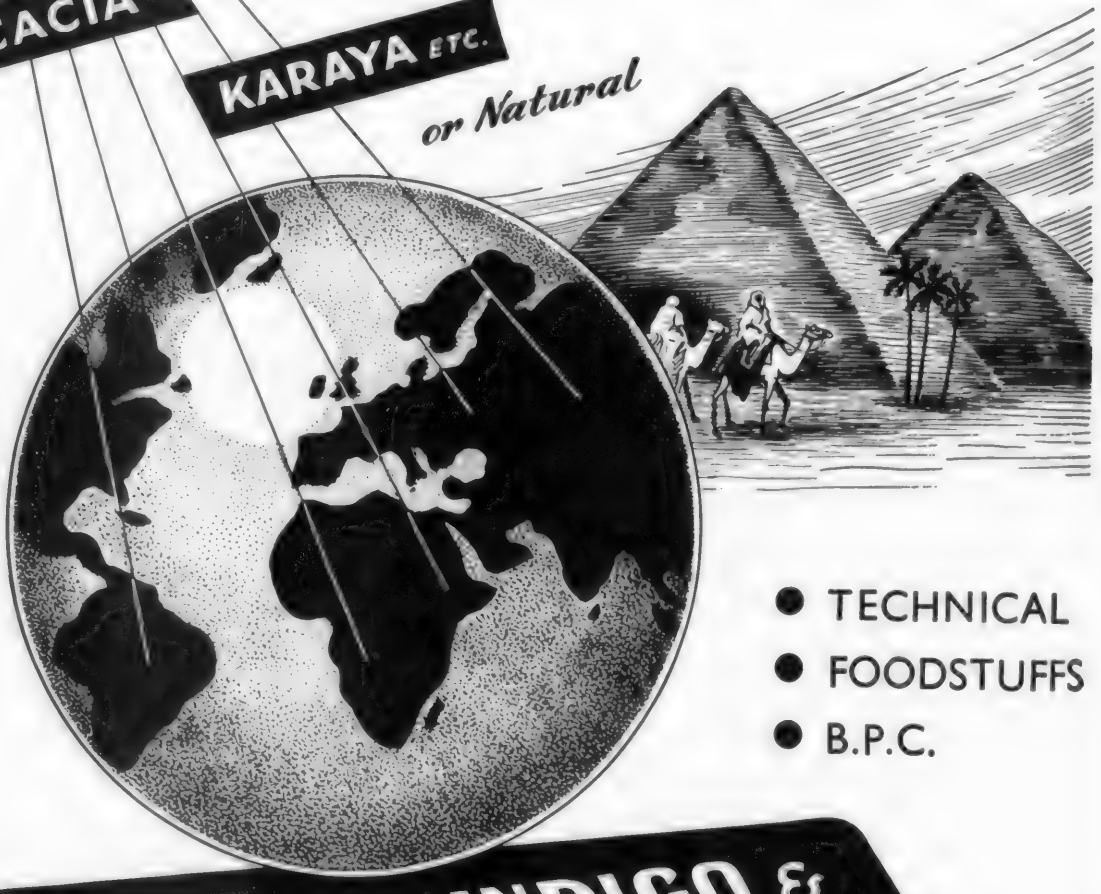

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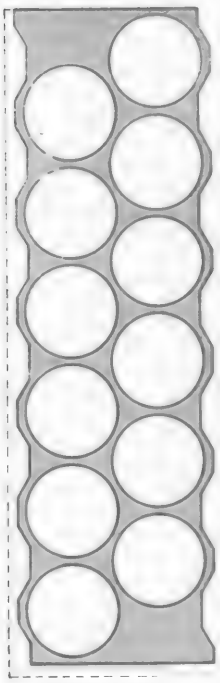

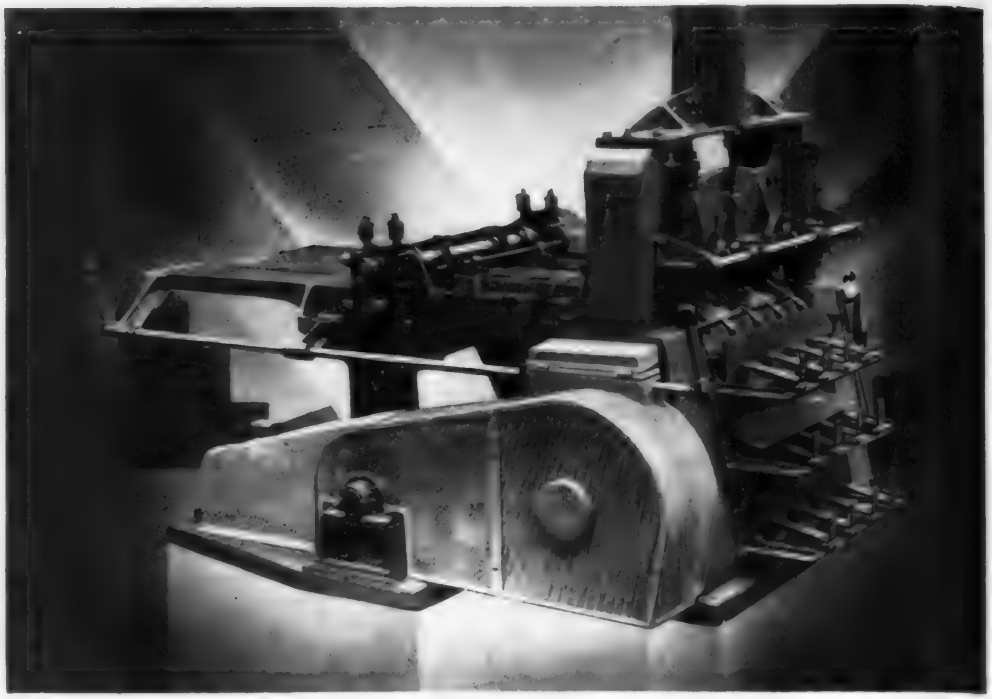

How to save 7% on scrap with the BLISS AUTOMATIC SCROLL SHEAR

Yes, by using the Bliss Automatic Scroll Shear, many leading can plants save up to 7% on scrap—and the illustrations on the right explain how it is done.

But this is only one of the features of the Bliss Shear. The rigid body structure and heavy sliding members ensure long die life; the sheets are automatically and precisely located; all operating mechanisms are below the table—lubricants never drop on and spoil sheets; the shear can be arranged for automatic or hand feed.

If you are looking for reliable can production it will pay you to remember . . . BLISS.

E. W. BLISS (England) LTD., City Road, DERBY

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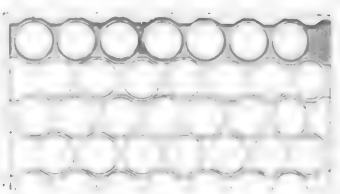
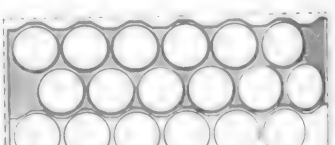


SINGLE ROW SCROLL STRIP offer savings over single strip method. In No. 1 can size, it saves 6.2%; in No. 2 size—4.6%. Two strips are blanked each stroke except the last.



DOUBLE ROW SCROLL STRIP—planned for double-die set-ups—gives even greater savings than above.

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on your machine is more than a name—*it's a guarantee*

BLISS CAN AND CONTAINER MAKING MACHINERY

SLITTERS BODYMAKERS FLANGERS SEAMERS SHEAR STRIP FEED PRESSES

AVAILABLE NOW . . .

B·C·L

"K" POLYTHENE

POLYTHENE PLUS EXCELLENCE IN PRINTING

A Triumph in Research

For many months the technical experts of British Cellophane Limited have applied their skill and knowledge of packaging materials to the task of developing a B.C.L. polythene film which could be printed with ease and success.

They have now produced B.C.L. "K" POLYTHENE—a polyethylene film KEYED to accept printing inks readily and hold them permanently.

Thus, to the well-tried protective qualities of their polythene film which makes it so dependable and versatile a packaging medium, B.C.L. now add an advantage which will increase enormously its commercial possibilities.

The special process is not a coating which comes off with normal handling and use but an integral treatment of the film which leaves its purity and non-toxic properties untouched.

PATENTS HAVE BEEN APPLIED FOR

B·C·L KEYED POLYTHENE

1. Provides a receptive surface for clear, bright and durable printing.
2. Laminates more readily . . . is more suitable for pressure sensitive tapes.
3. Retains all the **toughness, moistureproofness, purity, resistance to chemical action** and **great flexibility** inherent in polythene film.
4. Is available in the usual gauges from 150 to 500, both in layflat tube and roll form.

AT NO EXTRA COST!

B.C.L. polythene film which gives packaging perfection for a diversity of goods from frozen foods to machine parts and can now be successfully printed, may be the answer to your packaging problems. The scientific and technical services of British Cellophane Limited which made this great general advance possible are as readily at your disposal for your own particular needs.

Send today for samples and full details of the new . . .

B·C·L

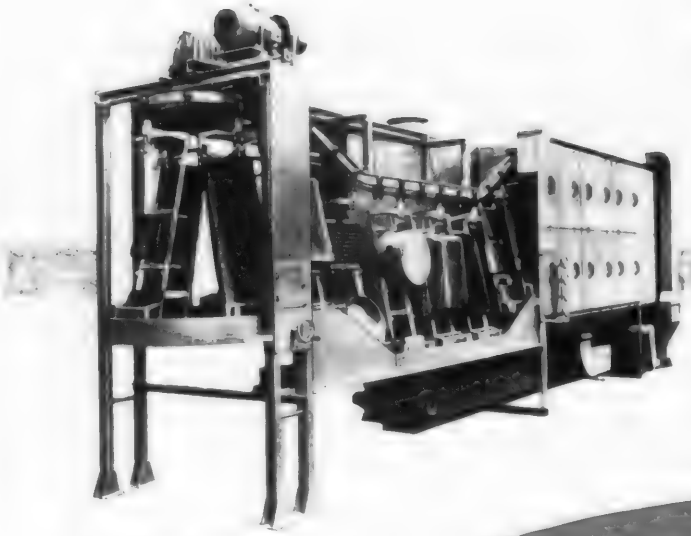
KEYED POLYTHENE FILM

BRITISH CELLOPHANE LIMITED

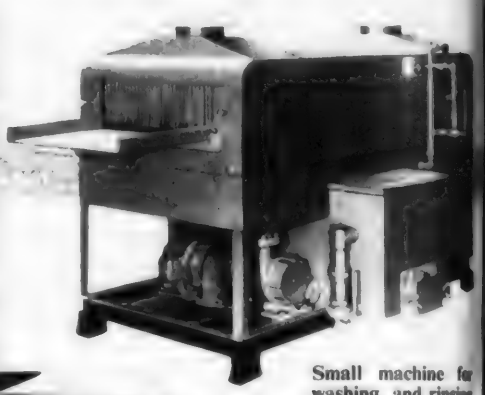
SALES OFFICES: 12-13 CONDUIT STREET, LONDON, W.1. TELEPHONE: MAYFAIR 8721

Reg. Offices and Factory: BATH ROAD, BRIDGWATER, SOMERSET

WASH



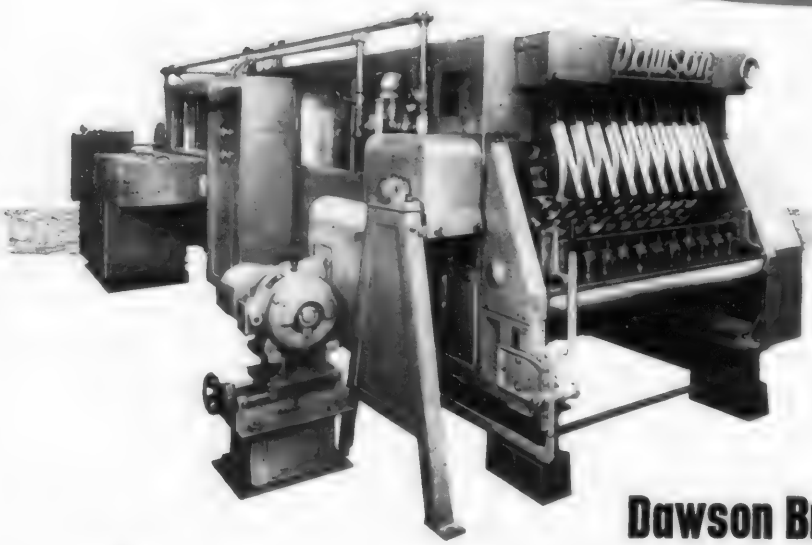
A monorail machine for washing, rinsing and drying varied Food Utensils.



Small machine for washing, and rinsing Bakers' Trays.

ESTABLISHED 1864

The Quick, Economical
Dawson
Hygienic way

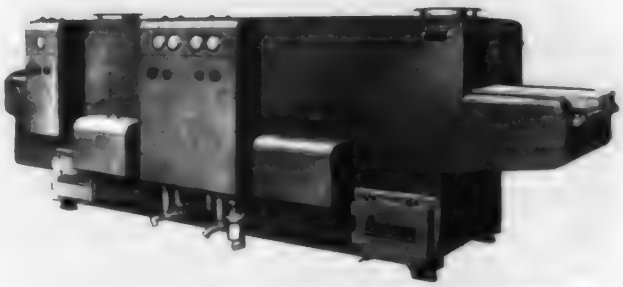


A Bottle and Jam Jar washing, de-labelling, rinsing and sterilising machine.

Tel.: Cleckheaton 1080 (5 lines)

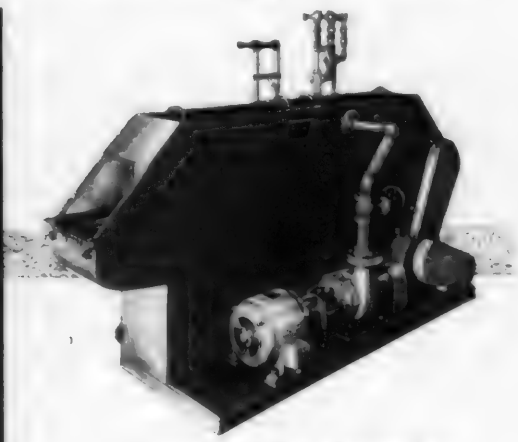
Dawson Bros. Ltd., Gomersal, Nr. LEEDS

CLEAN



Washes, rinses and sterilises 200—300 trays per hour.

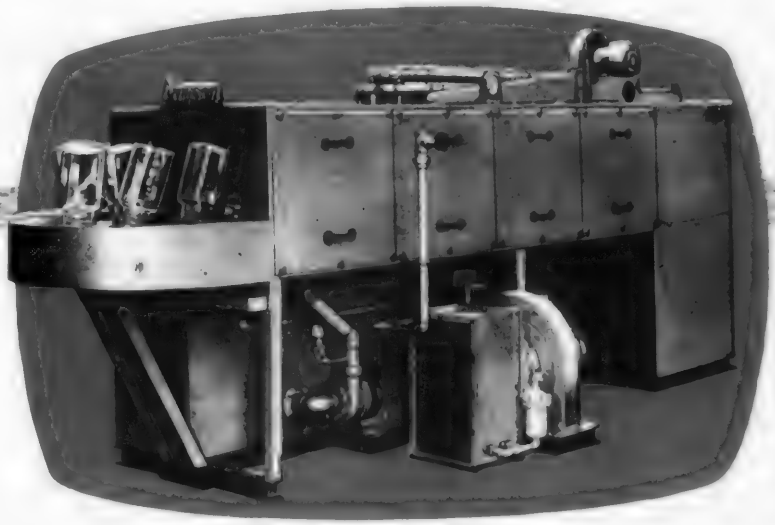
For washing and de-labelling and drying biscuit tins and lids. Capacity 2,000 per hour.



Small Can Washer and Rinser for 30—60 cans per minute.

Make sure that every type of container and utensil used in the manufacture of Food Products is clean, sterile and satisfies Health Regulations.

Dawson washing plant is used extensively today by manufacturers of all types of Food products. Whatever the size or shape of tin, can, tray, jar, bottle, container, mould or food utensil Dawson machines will wash and dry these articles in the minimum time for the lowest cost. Let us know what you have to clean and we shall be pleased to advise you.



A Rotary Jar and Tin washing and drying machine. Capacity 150 per hour.

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There's a Wolf in Sheep's Clothing around...

This Semtex installation in the Liverpool premises of Threlfall's Brewery Company Ltd. was carried out in corrosion resistant paviors bedded and jointed in Semtex Latex Cement

It loiters in food factories where organic acids, alkaline action, heat, steam and other conditions encourage corrosion. Yes—*corrosion is it's name.* In many factories, structures of floors which *looked safe* have eventually revealed this masked enemy. In others it finds no entry. Why? Because all surfaces exposed to risk have been treated in accordance with the Semtex technique; selection of the right anti-corrosion cement for the job.

Semtex has available a whole range of such compounds, membranes, linings, bedding and jointing materials, protective paints and so on. As corrosive-resistant as the dependable bricks and tiles they are intended to bond, they are used by the Semtex organisation in the execution of corrosion-resistant structural schemes all over the country.

This company welcomes enquiries from those who would like to know more about its specialist service or about the anti-corrosion products which are available to firms who employ their own maintenance units.

Comprising 28 pages of useful data and copiously illustrated with photographs of Semtex corrosion-resistant installations, this booklet describes the full range of Semtex cement compounds in detail and gives the factors governing the choice of an appropriate cement. A complimentary copy will be sent you on request.

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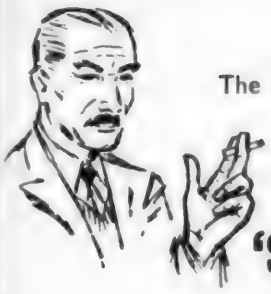

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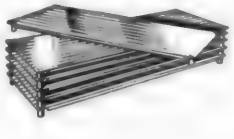

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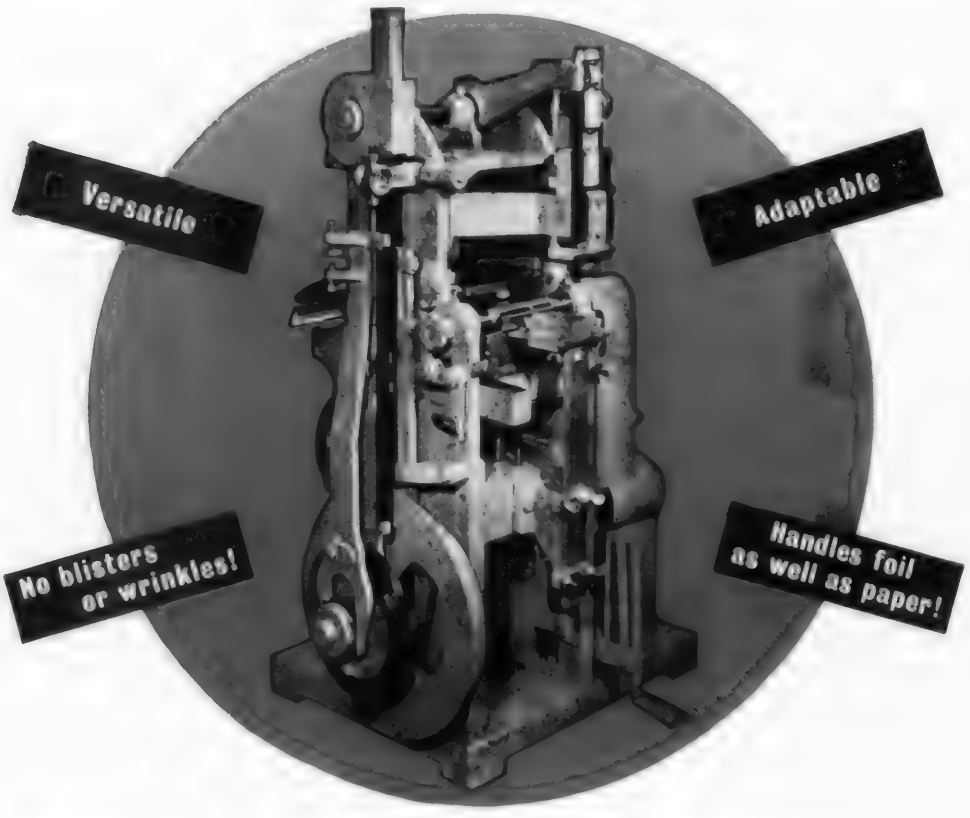

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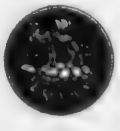

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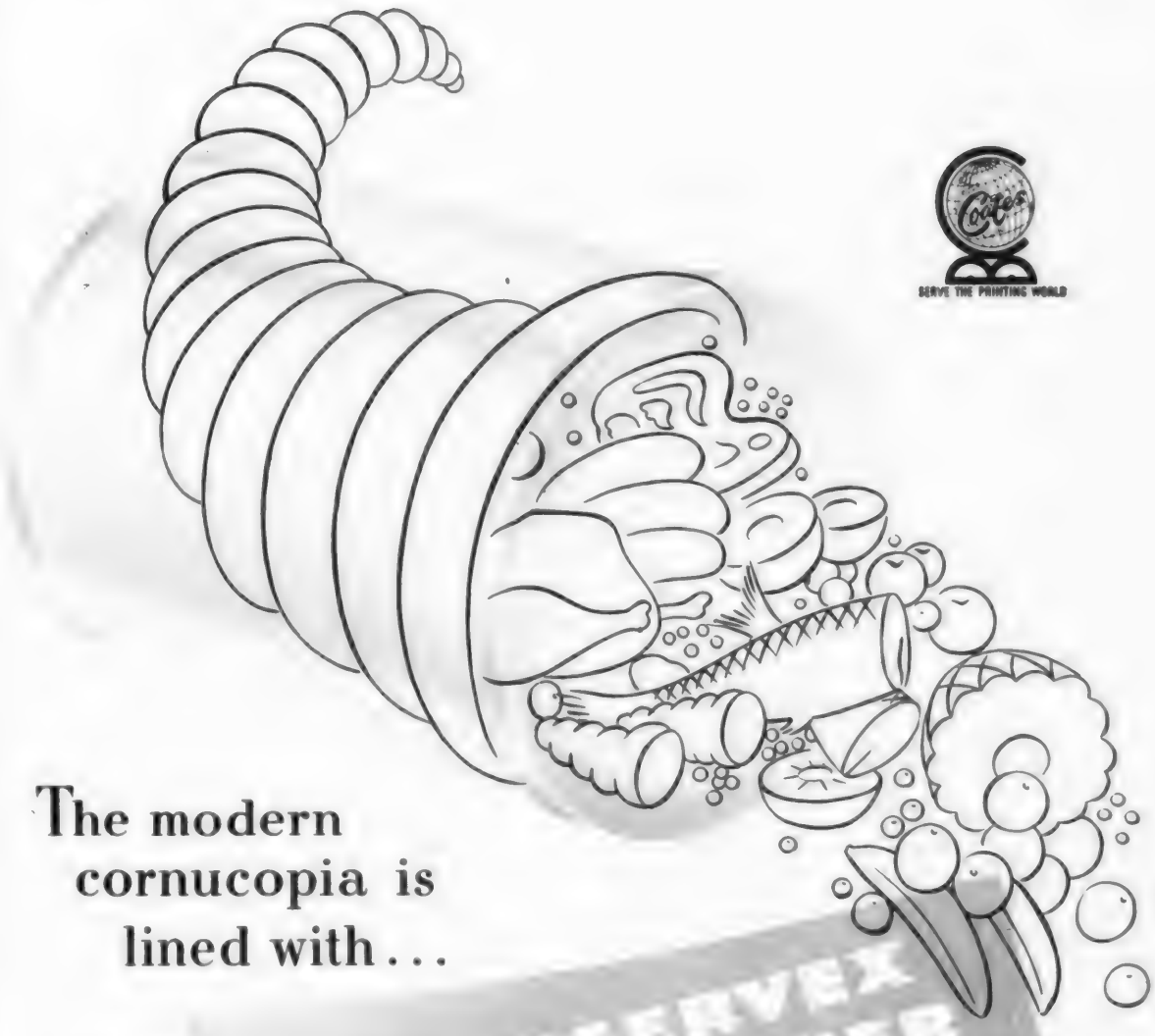

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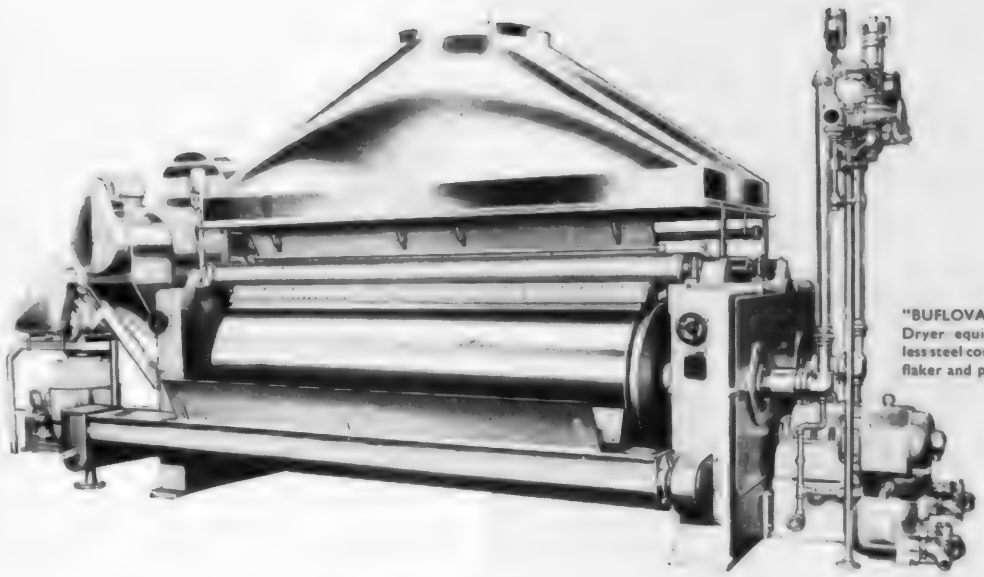

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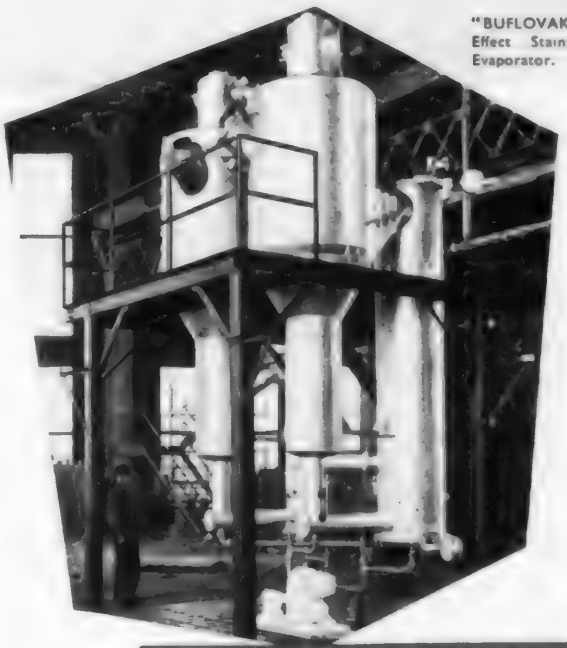

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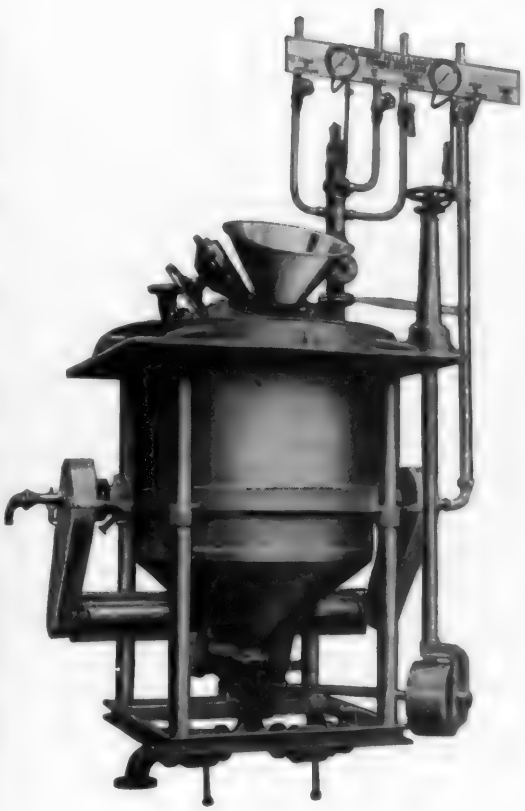

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No steam jacket is employed, there is no local overheating or skin burning of the product, no pitting or erosion.
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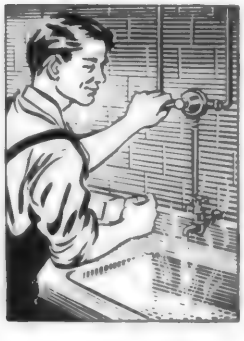

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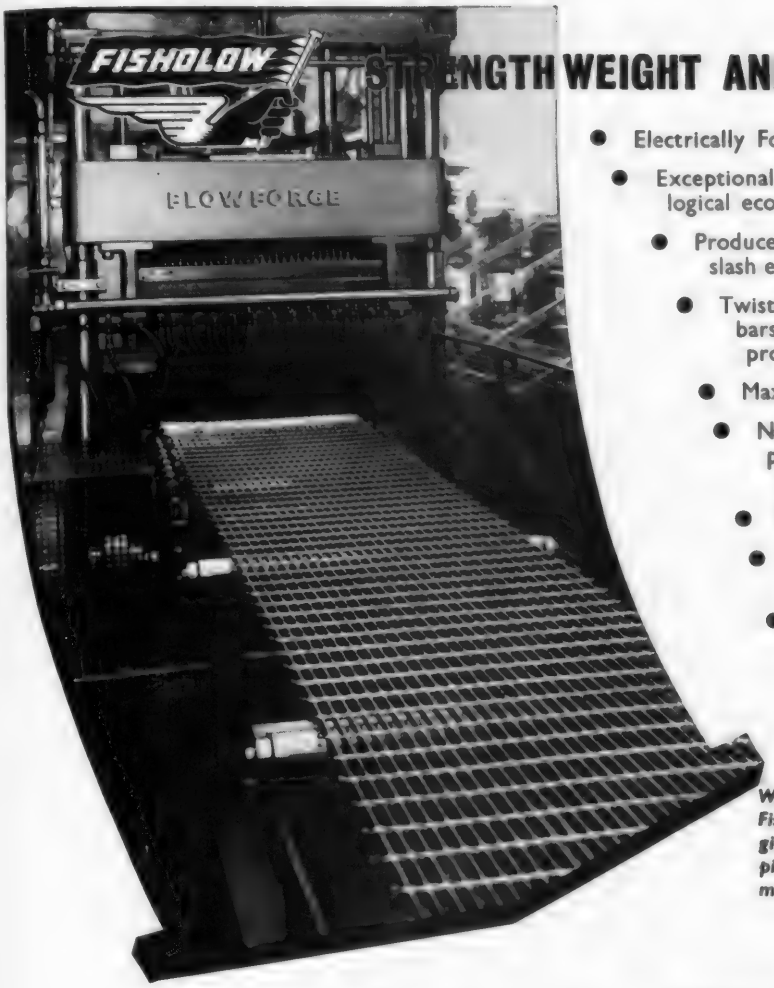

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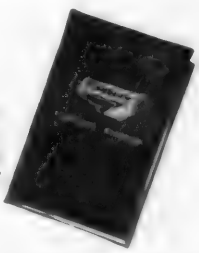

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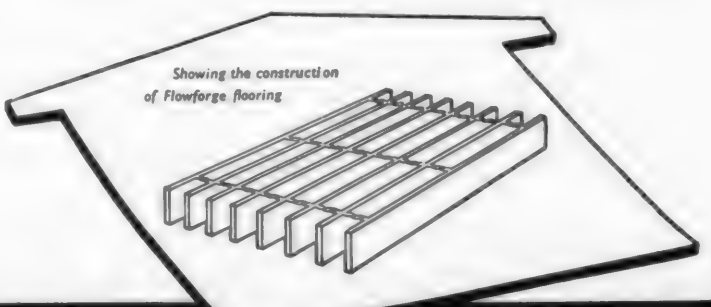

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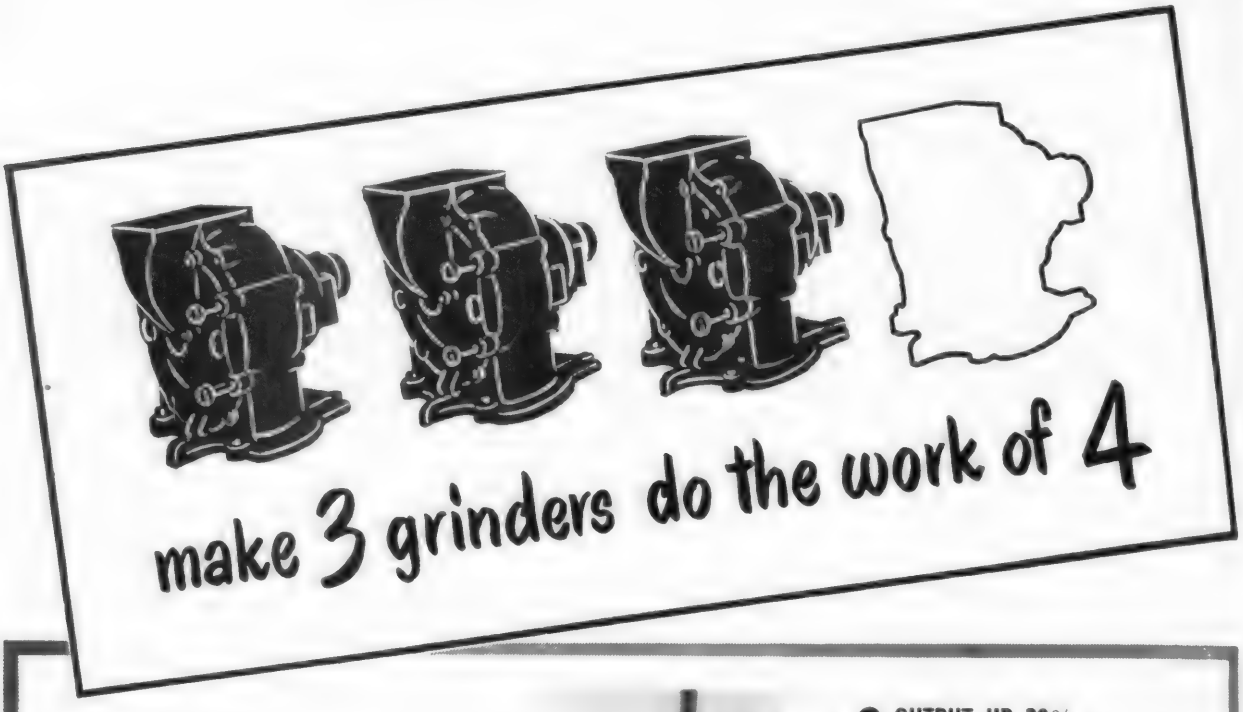

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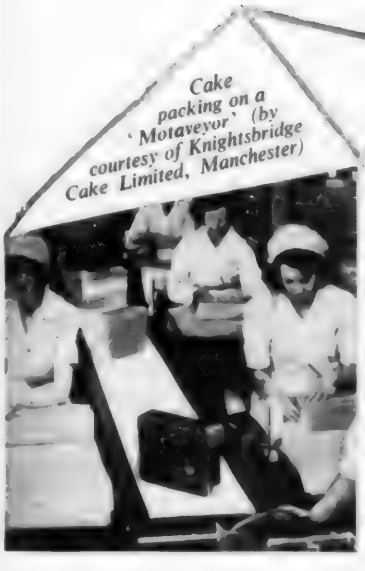
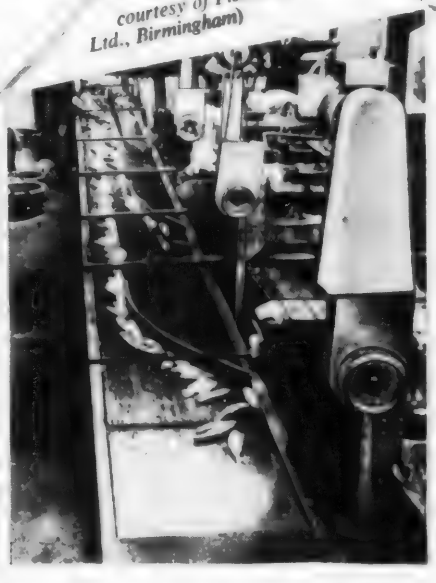


Cake packing on a 'Motaveyor' (by courtesy of Knightsbridge Cake Limited, Manchester)

Fruit bottling on a 'Motaveyor' conveyor (by courtesy of J. Mawdsley Ltd., Wigan)



Scandura conveyor in a fish canning factory (by courtesy of Fisher & Ludlow Ltd., Birmingham)

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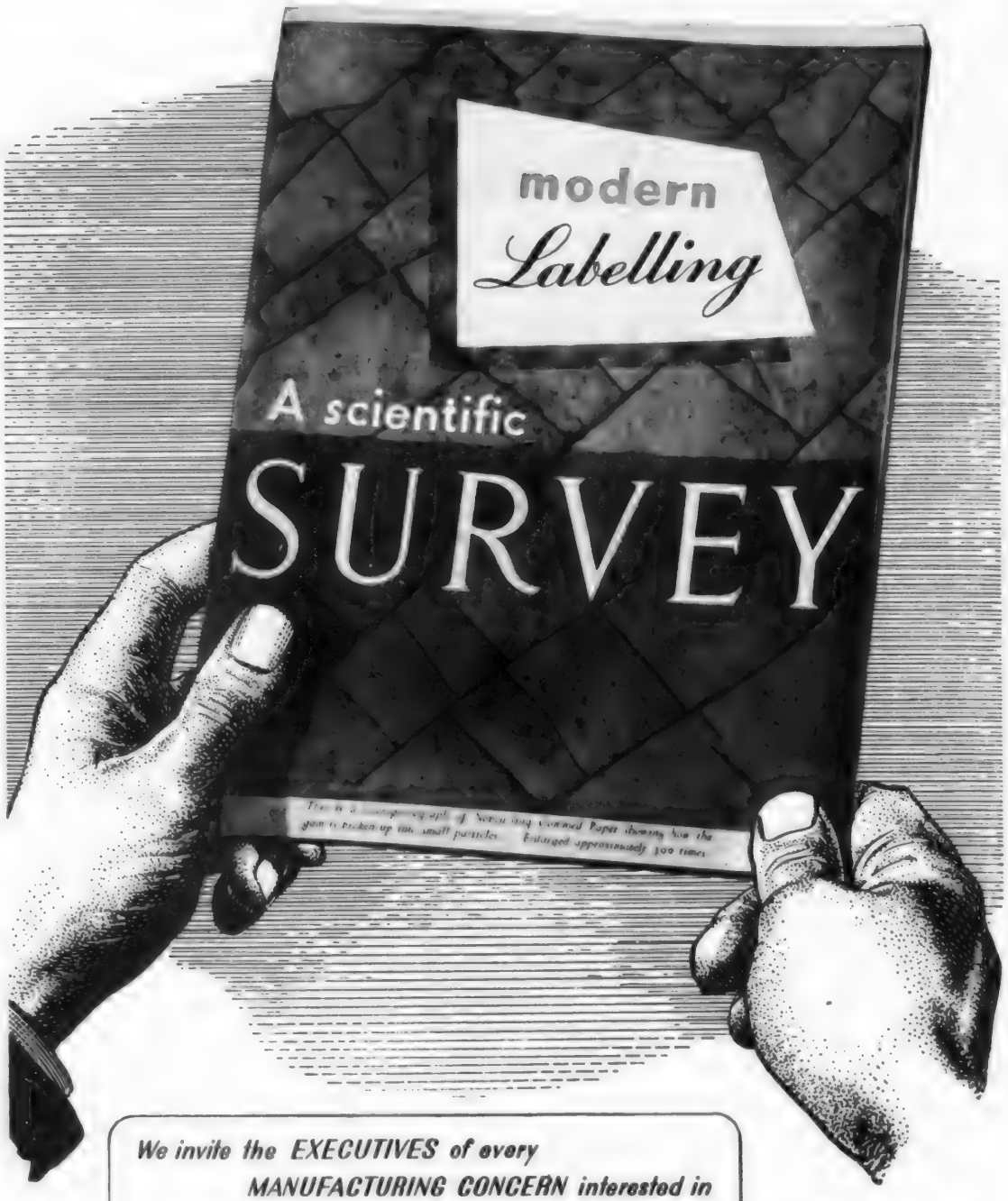

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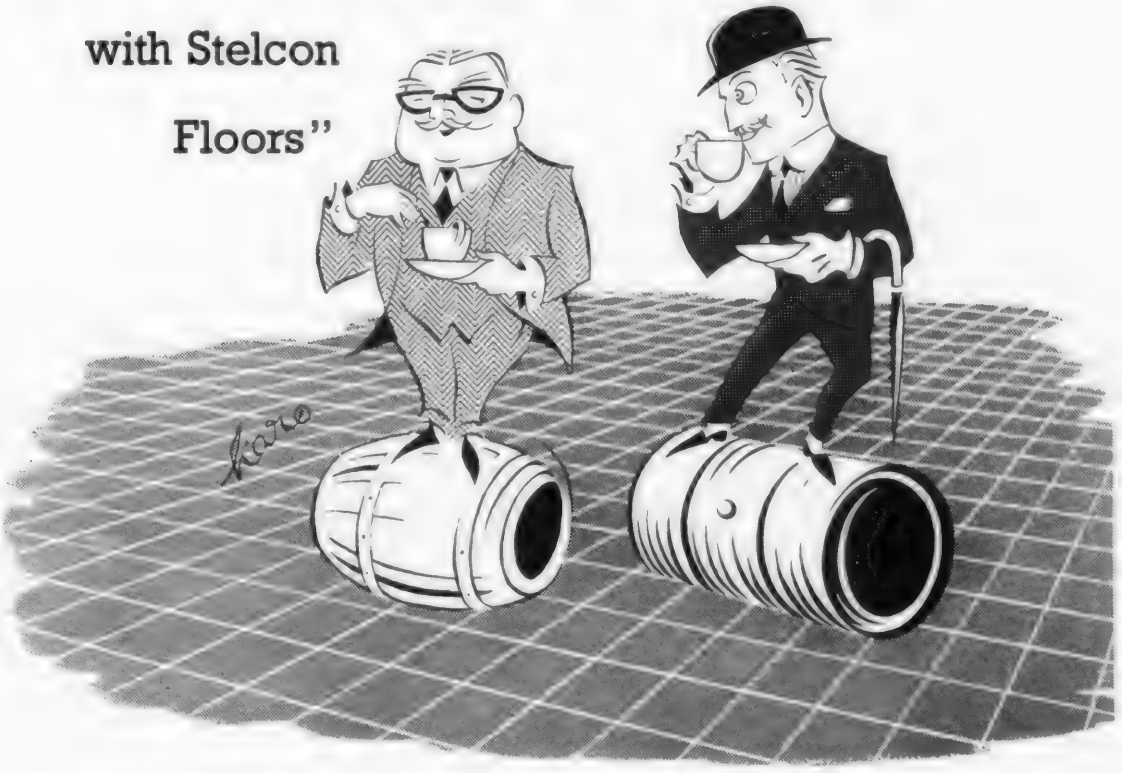

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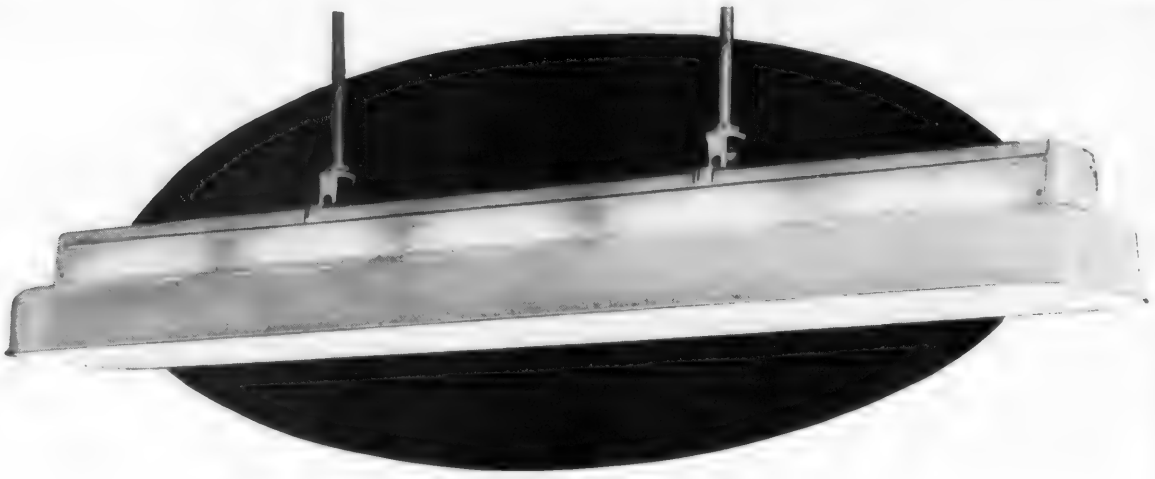

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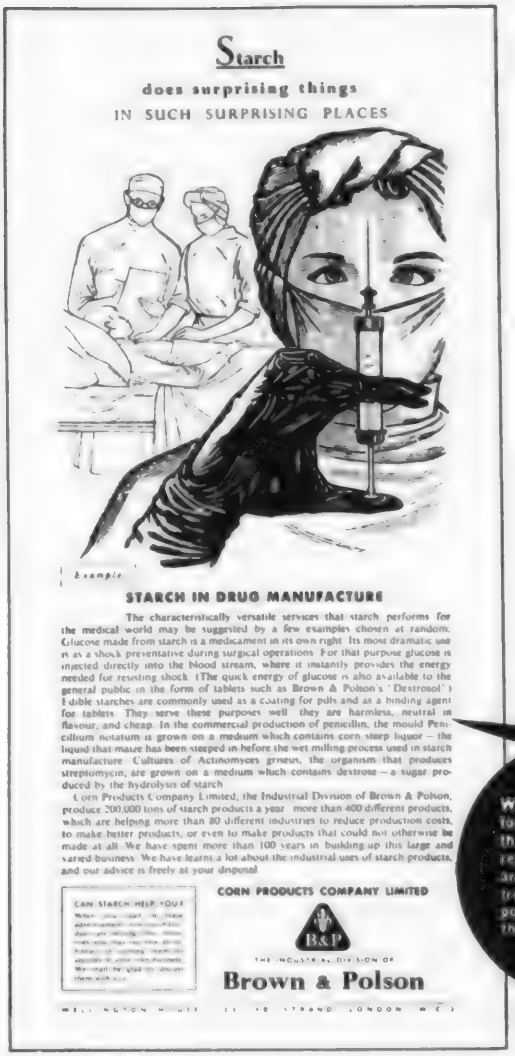
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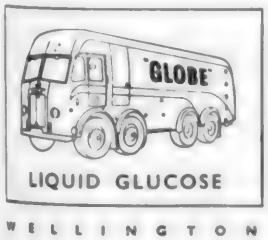

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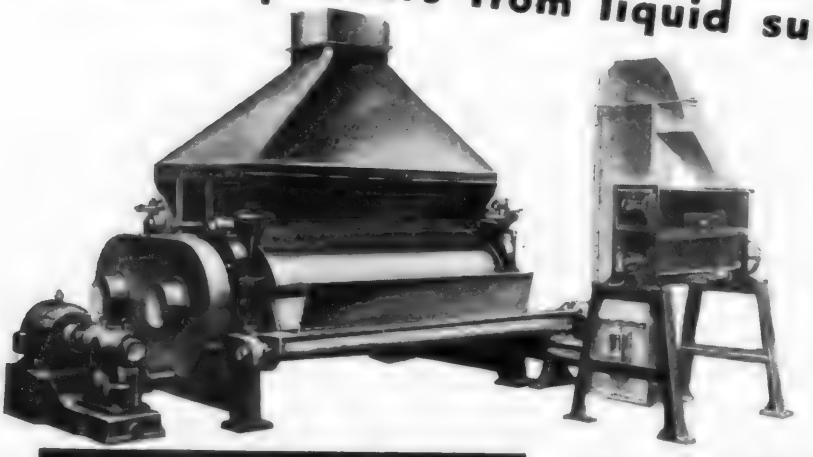

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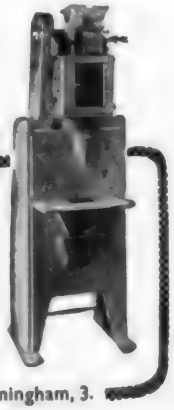

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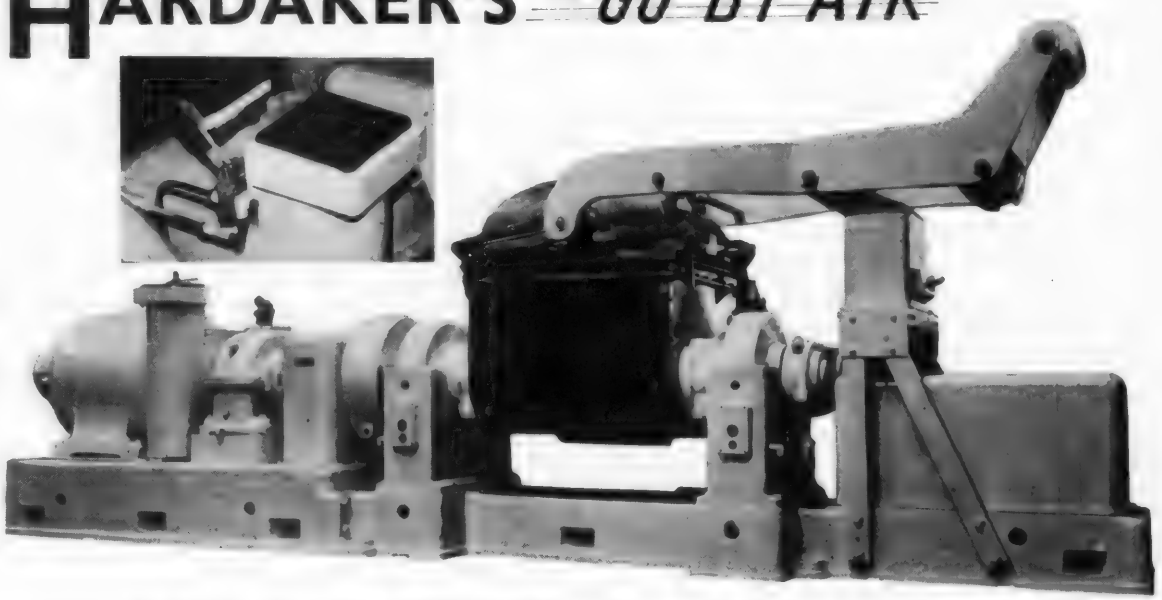

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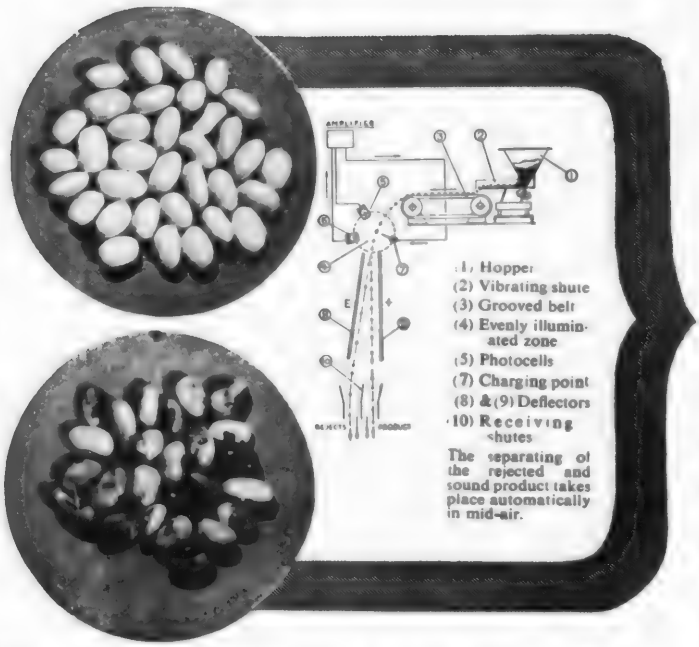
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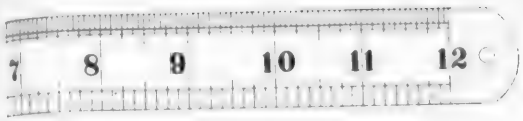

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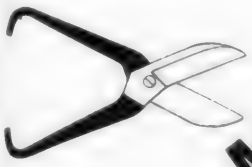

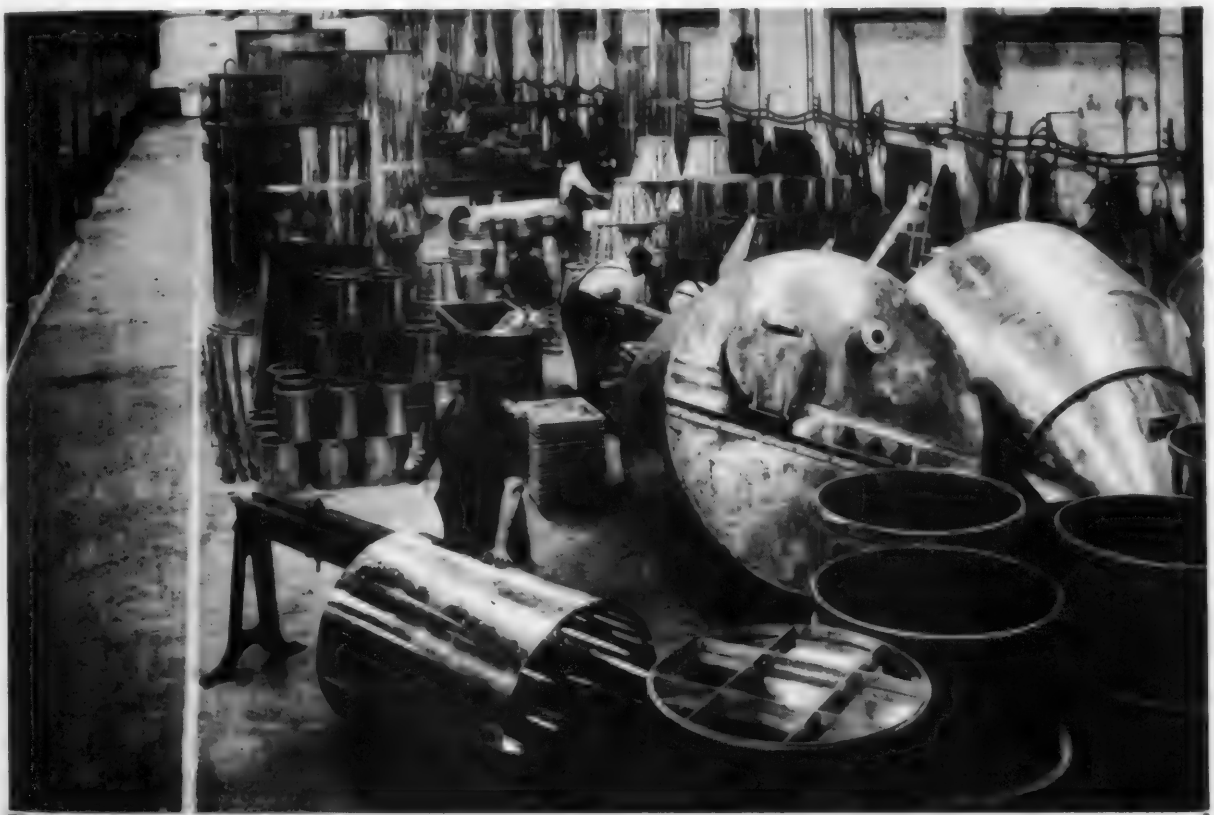

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FOOD MANUFACTURE

Vol. XXIX. No. 9 • Published Monthly • September 1, 1954

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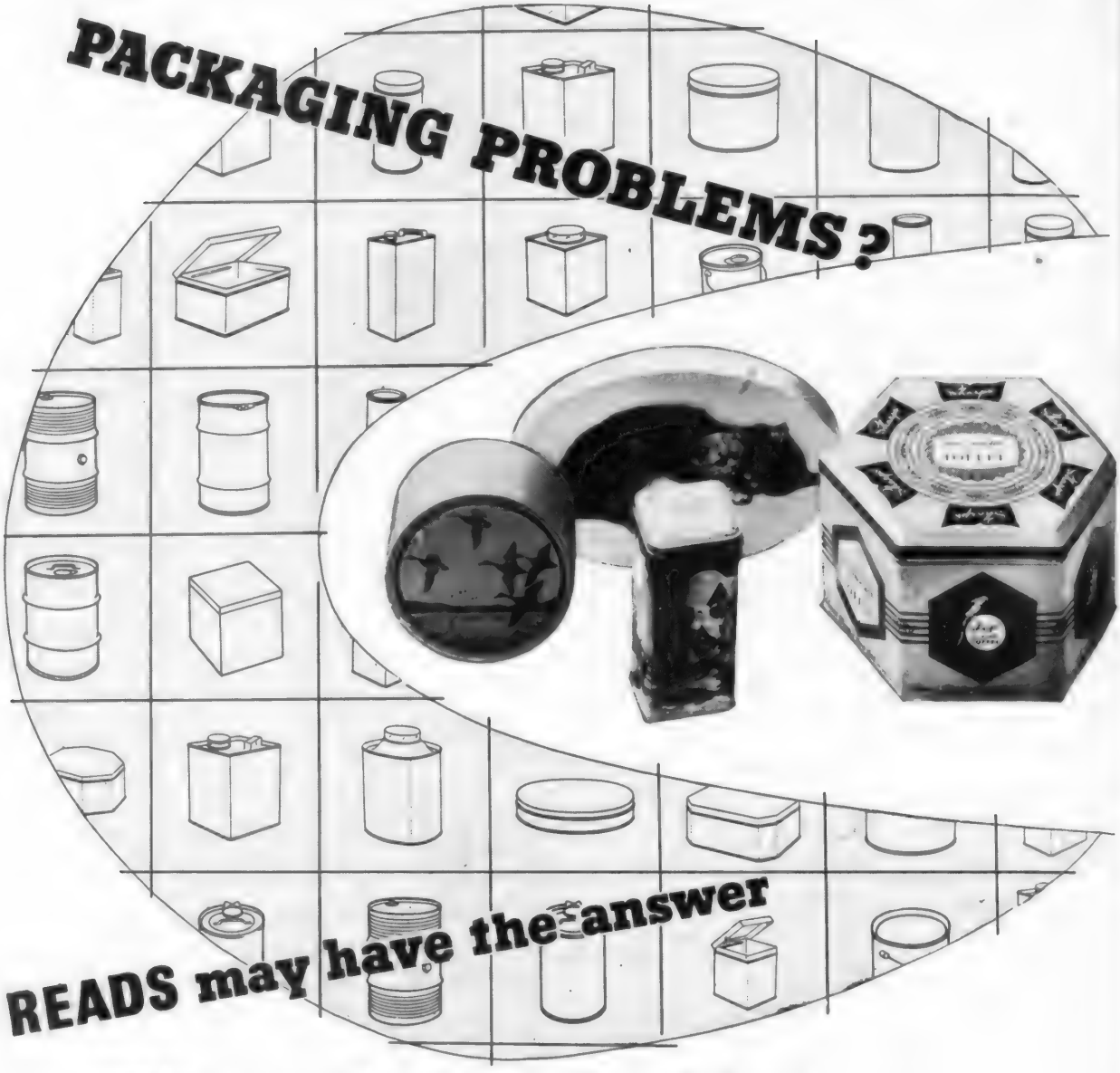

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FOOD MANUFACTURE

Vol. XXIX, No. 9 September 1, 1954

Food Handling Legislation

SOME time has elapsed since the Food and Drugs Amendment Bill was referred to the House of Commons by the House of Lords on March 30, the Second Reading eventually being given on July 23, at very short notice, when it was referred to the whole House in Committee on July 26. Owing to pressure of business, it was not possible to discuss the Bill in Committee, and although no serious proposals for amendment were made during the Reading, there is still time for important ones to be suggested.

In moving the Reading, Dr. Charles Hill outlined the four main provisions in the new Bill, the first of which constitutes an endeavour to tie up the present impracticability of Sections 8 and 13 of the Food and Drugs Act, 1938. Section 8 of the existing Act gives the Minister power to make regulations for the prevention of danger to health from almost any cause whatever, whereas Section 13 lays down several provisions for premises where food is to be prepared or stored, thereby rendering Section 8 inoperative.

The second provision relates to the power of the Minister to make regulations respecting the composition of foods and gives him authority to require disclosure of any substances employed in their manufacture.

The third concerns the microbiological contamination of food sold to the public; lastly, the Bill is intended to bring into permanent legislation those Defence Regulations which have been found to be useful and which can no longer be properly referred to as necessary for the Defence of the Realm.

Although the House was regaled with harrowing tales of food poisoning, the Bill was passed without a Division but not without criticism from the Opposition, who chided the Government for its weakness in watering down the proposed regulations for the hygienic handling of food and for including many points in the Code of Practice which it is recognised cannot be enforced by law. Nevertheless, it was noticeable that both parties claimed credit for the Bill.

Despite the reference to the use of chemicals in food, it is remarkable how the public interest has been transferred in recent years from the chemical to the microbiological aspect of adulteration. A century ago, stalwarts like Accum, Wakeley, and Hassall were ridiculed for their outspoken criticism of the gross adulteration then occurring in food; even a Select Committee reported that people were not being so much poisoned as cheated. Will people laugh a hundred years hence at the suggestions now being made that it is impossible to control the small teashop, where the single assistant with a streaming cold runs round to the W.C. and rushes back to cope with the queue of waiting customers without washing her hands?

Reputable manufacturers do not fear legislation requiring food to be handled in a hygienic manner at all stages of its preparation; their only fear is of the backyard competitor who, in making his own profit, brings his respectable neighbour into disrepute.

Groundnuts Again

A FORMER Director of Agriculture in Kenya, Mr. Stuart Gillett, C.M.G., has been appointed chairman of the new board of the Overseas Food Corporation, with headquarters in Tanganyika, the personnel of which is now to include a high proportion of members with long experience of East African conditions; some of them were formerly members of the Colonial Agriculture Service.

From a perusal of the last report of the Corporation, it is probably not too much to say that the unfortunate experiences of the past were in no small part due to the readiness of those in authority to accept the views of people whose visionary enthusiasm and volubility were only exceeded by their failure to be guided by those who knew the actual conditions on the spot. The present reorientation of control offers at least a chance of some benefit ultimately emerging from past failures.

The programme now entered upon is essentially one of cautious large scale experiment designed to ascertain what really can be accomplished in a naturally dry, poor, and unpromising region. The millions of acres originally intended for cultivation have now been whittled down to a mere 40,000 in Kongwa, Urambo, and Nachingwea, and divided into a series of farming blocks each under the charge of an experienced farm manager.

Although the scale of these operations has been thus reduced, they still represent a very considerable enterprise when judged in terms of previous large scale farming operations in the tropics.

Gone is the intention to concentrate on the production of a single crop, *i.e.* groundnuts, although they are still included in the programme. Experience indicates that Rosette disease is an obstacle to groundnut cultivation which has not been surmounted, a point which was stressed but disregarded when the scheme was first launched. Instead, there has been substituted a plan of large scale experiments with a series of crops including, in addition to groundnuts, cotton, maize, sorghum, soya beans, fibre crops, fodder crops, and tobacco as well as trials with various forms of animal husbandry.

At Kongwa in 1952-53 rainfall was so low that attempts at crop production were a total failure. As the report points out, the year was one of low rainfall throughout East Africa, but at Urambo and Nachingwea fair crops were reaped. Previous experience has shown that Kongwa itself is so liable to drought that prospects of it ever becoming a region of profitable cropping are doubtful. It seems at least probable that at best it can be only a marginal region, if agriculture can be profitably undertaken there at all. Prospects at Urambo and Nachingwea are better. At Urambo, an attempt is being made to develop an African co-operative tenant scheme, while at Nachingwea interest centres on a European settlement scheme designed to examine the potentialities and economics of farming this land by settlers.

The scientific services, which to the minds of many constituted the one bright spot in the past history of the Corporation's operations, have been reorganised as separate activities at the three centres. The work has included soil studies, economic botanical investigations, fertility studies, and pest control research.

It is heartening to learn of the efforts being made to reorientate development along sound and rational lines; out of the welter of errors and failure which attended the original scheme, it may be that a successful form of development for the lands of this marginal region will eventually emerge.

Food Sterilisation by Irradiation

STERILISATION of food products by the use of atomic energy may soon be a commercial proposition. For the first time, waste products from atomic weapon manufacture are now to be used for experimental irradiation of foods in the laboratories of the Department of Food Technology at the Massachusetts Institute of Technology.

The Argonne National Laboratories, operated by the University of Chicago in Lemont, Illinois, announced recently the shipment to M.I.T. of the first of a new type of experimental radiation source which uses nuclear-reactor waste products.

This source is to be used in connexion with equipment which will for the first time make possible the irradiation of food in commercial sized containers.

The new energy source, equivalent in radiation intensity to several pounds of radium, is a small hollow cylindrical block of concrete which was prepared by mixing cement with the liquid radioactive fission products. The latter are the by-products created when neutrons bombard uranium-235 in a nuclear reactor. The highly radioactive cement-fission product mixture is surrounded on all sides by several inches of ordinary concrete and a lead shield which is also several inches thick to protect workers from harmful radiation. An opening into the centre of the source is provided so that materials to be irradiated may be lowered into the active region.

The source produces γ-radiation, very similar to that from the radioactive cobalt source which has already been studied at M.I.T. Radioactive cobalt is not available in large enough quantities to handle the output of any commercial food producer.

The present research will be devoted to the γ-rays produced by the new source, determining their effects on various foods, and learning how long the source can be used without renewal. Special automatic equipment to introduce three small-size food cans into the active region of the new source is now being built to M.I.T. specifications.

Food and Dental Caries

A MEMORANDUM (*Brit. Dent. J.*, 1954, **86**, 199) drawn up by the British Dental Association's Child Dental Health Committee presents evidence that dental caries is associated with the stagnation of food, in particular refined carbohydrates, around the teeth. The lower dental caries incidence in countries where sugar and sweets were rationed during the two world wars went to prove this point. The studies in dental caries recently carried out in Sweden have shown that the greatest damage to the dental structures results from eating sweets and other snacks between meals, while a similar total quantity of this type of food taken at mealtimes is not so detrimental.

Dental decay can be largely controlled outside the dentist's surgery. It can be reduced by limiting the consumption of sticky sweets, particularly between meals. Apart from this, tooth-brushing must be carried out immediately after eating and the method of doing this must be correct and thorough.

The experimental use of chemicals as a preventive measure has proved disappointing. Topical applications of silver nitrate have not been successful and sodium fluoride not so successful as was hoped, although the results of the large scale investigation of the Fluoride Working Party of the Ministry of Education are expected to indicate the value of this measure.

Caries-inhibiting substances incorporated in toothpastes are looked upon by the committee with reserve and some, containing penicillin, with disfavour.

In addition to dietary control, it is the opinion of a writer in the *British Medical Journal* (May 15, 1954) that the most hopeful means of preventing caries is the introduction of one part per million of sodium fluoride into the public water supply. This practice, widely adopted in the United States since 1945, has been observed to reduce the caries rate. An investigation on these lines is proposed for Britain. People living in districts where their water supply contains one part per million of sodium fluoride have been found to have better teeth than those whose drinking water is lacking in that substance, but fluoridation should only be considered as a part of the measures necessary to remedy the prevalent bad state of the teeth of people on this island.

Government Food Control

THIS issue of FOOD MANUFACTURE is the first in which it has been possible to add one's expressions of satisfaction at the end of all food rationing after 14½ years. We feel that there is nothing to add to what has already been said about this historical event during the month which has elapsed. At the time of writing, "rationing by price" is the order of the day, but we are assured that this is merely temporary. In the meantime, fillet steak and similar delicacies are as inaccessible to those with incomes in the lower brackets as they ever were.

For the record, it may be useful to transcribe a number of important functions of government which will remain. These are:

1. Implementation with the Agricultural Departments of the farm price guarantees in free market conditions.
2. Administration of deficiency payments schemes for the four main cereal crops and for livestock; support prices for eggs and potatoes.
3. Administration of subsidies totalling £285 million a year, including subsidies on bread and milk and welfare subsidies.
4. Various responsibilities under continuing long-term contracts, *e.g.* for bacon, meat (with Australia), coffee, copra, and orange juice. Continuing purchase of sugar to implement the Commonwealth Sugar Agreement.
5. Oversight of import programmes for balance of payments reasons.
6. Questions arising under the International Sugar Agreement and the Commonwealth Sugar Agreement and in connexion with such bodies as FAO, OEEC, NATO, and EPU.
7. Defence Plans—Civil Defence organisation—stockpiling.
8. Food standards, food and drugs legislation, and slaughterhouse legislation.
9. Welfare foods and nutritional policy.
10. Disposal of stocks; winding up of accounts, etc.

Prepackaging Farm Produce

LARGE scale research into the prepackaging of farm and market garden produce is to be undertaken by a new organisation sponsored by the Farmers' Central Organisation.

The success of last year's pilot experiment on tomatoes carried out at Worthing has justified this more comprehensive project which will enable many different types of packaging material and machinery to be tested, as well as methods of distribution and marketing of a large number of prepackaged commodities on a nationally co-ordinated and permanent basis.

Preliminary trials are to be carried out by two F.C.O. member societies—Farmers and Growers Industries Ltd., at Worthing, and the East Midlands Marketing Association, Ltd., at St. Ives, Hunts.

At Worthing, they will be concerned with the use of cartons for mushrooms and of various types of wrapping material for apples and tomatoes. At St. Ives, a new and highly adaptable machine is to be used for overwrapping plums and apples, mixed salad packs, and trays of vegetables.

It is anticipated that over a million experimental packs will be turned out this year.

Chicken Flavour

DOES the flavour of chicken come from the bones, the flesh, the fat, or the skin? This has been the subject of research by the United States Department of Agriculture (*J. Agric. and Food Chem.*, 1954, **2**, 364).

The experiments carried out have clearly indicated that the main source of flavour is the flesh, there being scarcely any contribution from the fat, and not a great deal from either bones or skin. There is no significant difference between the flavour contributions of light or dark meat, but an important and surprising discovery is that the flavour precursors are readily extracted from minced raw meat by cold water, demonstrated by the loss of flavour in the meat after soaking. As chickens are often commercially chilled in ice water during storage and distribution, this factor is to be the subject of further research, and constitutes a point that might well be studied by the British poultry industry and chicken canners.

Stabilisation of Papain

TWO methods used for the stabilisation of papain are the formation of a "salt paste" and the use of sulphur dioxide which, by destroying the oxidases present in the latex, removes the main cause of deterioration.

The fresh latex is cautiously mixed with a saturated solution of sulphur dioxide, a small sample being withdrawn after each addition and tested with

benzidene-hydrogen peroxide reagent, until a positive oxidase reaction is no longer obtained. Excess of sulphur dioxide must be avoided, the amount required being usually about 5 per cent. (by weight), calculated on the weight of wet latex. The latex is then dried either *in vacuo* at 55°C. or in an incubator at 38°C.

Compared with untreated juice dried under the same conditions, the product is superior in colour, activity, and storage properties.

Other investigations have shown that the following procedures gave good storage properties: (*a*) quick freezing of the latex and storage in the frozen state; (*b*) addition of 2 per cent. sodium bisulphite and drying in an oven at 55°C.; and (*c*) addition of 0·2 per cent. thymol and 0·5 per cent. sodium bisulphite, followed by an interval of three to 24 hours before drying in an oven at 50° to 70°C. Under (*a*) there was little loss in activity after three years' storage, under (*b*) after two years' storage, and under (*c*) after nearly two years' storage.

These investigations should be of considerable interest to suppliers of commercial papain sold as meat "tenderisers," as hitherto it has always been difficult to produce a stable product.

Canners and Growers Co-operate

THE maintenance of co-operation with the processing industries is one of the chief functions of the Scottish Horticultural Research Institute at Invergowrie, near Dundee, whose director, Dr. T. Swarbrick, is receiving the active support of the major food manufacturing firms in the area.

The manufacturers' role is to indicate the type of produce wanted and the characteristics which will result in the production of an attractive pack, and to carry out pilot scale tests under actual manufacturing conditions which will demonstrate defects not otherwise evident.

As a result of this collaboration, it should ultimately be possible to provide crops to meet the most exacting demands of the processors and which, at the same time, are satisfactory to the grower from an economic viewpoint.

Entirely new fields of production are being opened up in this way. It has been argued, for example, that spinach is not suitable for cultivation in Scotland, but trials have already demonstrated that varieties of Dutch and Scandinavian origin will do well. When this particular work is finalised, canners in the area will have available a new vegetable for inclusion in the factory programme and growers a crop which, until now, has been regarded as uneconomic and impossible to grow.

The bulk of this research work is being carried out at the Mylnfield Centre at Invergowrie, where field trials with peas are now in progress to test six varieties of selected strains to assess their suitability for canning. French bean trials are being directed towards the production of a stringless type, capable of cultivation in Scotland and suitable for canning. Refugee has been a satisfactory strain in England, but it carries its main crop too late in Scotland to make it a satisfactory yielder. Attention has thus been given to American and Scandinavian strains and some 30 different varieties have been used to find the most suitable strain. This number has now been reduced to six, and from the group now on trial, information should be available at the end of the current season.

The fact that the larger canners are co-operating in this way must not be regarded as indicating any bias towards the processing industries to the disadvantage of the growers. It is inevitable, however, that expansion of production and utilisation in Scotland must come largely from the manufacturing side since there must be an ultimate saturation point to fresh consumption.

Solid Puddings

"BLESSED be he that invented pudding, for it is a Manna that hits the Palates of all Sortes of People." That blessing, referring particularly to English puddings since it was written by Monsieur Misson in his "Memoirs and Observations in Travels over England," was more concerned with lighter fare concocted from "Flower, Milk, Eggs, Butter, Sugar, Suet and Raisins, etc." Yet even this French visitor of 1719 knew well enough that there were puddings of heavier calibre, those intended by Pope in "weighing solid puddings against empty praise." For Misson waxes lyrical over "a great Nostrum, a learned Mixture of Neats-tongues, chicken, eggs, sugar, raisins, etc."

All of which causes us to wonder whether the heavier meatier pudding is disappearing from our recipes, whether the pudding and beef which make Britons fight, according to Dan Congreve quoted by Matthew Prior, have become beef alone. A Sussex Blanket Pudding, for example, though sounding heavy or stupefying enough by name, has only 12 oz. suet as its link with the animal world; an Ashdown pudding, specifying 4 oz. rump steak, is really a partridge pudding with the steak as accompaniment to "a brace of partridge (boilers)."

But now our hopes are revived by a report from the manager of Fleet Street's famous Cheshire Cheese, the one and only Cheshire Cheese so inseparably linked with Johnson, whose chair is still to be seen there. Now that shortages are gone, the Cheshire Cheese Pudding is to be reinstated. Rump steak, larks, oysters, and kidneys: such are some of its constituents; the rest is secret, passed down by word of mouth from manager to chef. Only labour shortages threaten to curtail this very solid pudding which weighs 120 lb., has to steam in its cauldron for 26 hours, and demands a night shift to cook it.

Mushroom Growing on Trays

Robert G. Darlington

Mushrooms have been esteemed a delicacy since ancient times, but it was as lately as 1905 that a worker in America perfected a method of spore germination and pure culture spawn production which revolutionised the mushroom growing industry. This article describes the methods of mushroom production employed by W. Darlington and Sons, one of Britain's largest commercial undertakings of this nature.

THE basic principles of commercial mushroom cultivation differ but little from those employed many years ago, but vast strides have been made in cultural technique and in the control of disease and pests.

In the earliest days of commercial production, mushrooms were grown on ridge beds made of well-rotted manure and covered with several inches of soil. These were laid in sheds, glasshouses, caves, and in Southern England in the open, where they cropped only during the warmer months of the year. Later, flat beds became more popular and the bulk of Britain's cultivated mushrooms were produced in glasshouses after the main summer crops, usually tomatoes, were finished. These, in turn, gave way to shelf beds, often six or eight tiers high and accommodated in specially built mushroom houses after the American fashion.

The rapid development of the industry to its present size has been largely attributed to the introduction of pure culture mushroom spawn. Prior to this, results had been uncertain; the spawn available was of unknown vigour and variety and sometimes contained mushroom diseases and insect pests. The pure culture provided the grower with a reliable and tested strain free from contamination. Impetus was also given by the knowledge gained from the extensive research into mushroom problems carried out in the United States and later, to a more limited extent, in Great Britain.

Since World War II, the introduction of yet another American innovation, the tray, or two zone, method of cultivation has had a profound effect on the industry in Britain, attributable, no doubt, to the readiness with which it lends itself to intensive mechanised production along factory lines. By this system, trays replace the long shelf beds and operations are divided into two distinct zones by the use of one room for pasteurisation and spawn growth and another for cropping.

The Tray System in Operation

The preparation of compost for tray culture proceeds on lines similar to those used for other systems of production. Fresh horse stable manure remains the most commonly used raw material.

Composting is a process of natural fermentation and is carried out in long narrow heaps, which are turned, mixed, aerated, and restacked at intervals of three to six days. Activators or supplements designed to stimulate fermentation are added early in the process, enabling it to be completed in as little as 10 to 12 days.

Reductions in labour costs are ensured by the adoption of mechanical means for the handling and turning of manure during composting. Tractor or crane operated grabs feed the manure on to turning or mixing machines on which it is shaken out, aerated, and watered, and thrown up on to the new heap. In this way, large quantities of manure are converted into a uniform compost at relatively low cost.

The trays, usually five to six inches deep, are filled mechanically, or by hand, and move by roller conveyor to a pasteurising chamber or heat room, where they are stacked one above the other 10 or 12 high, usually in double rows with gangways between. Trays, specially constructed for mush-

Outdoor ridges are still used to a limited extent in southern England.

Ridge beds in production under glass.

room growing, normally have ends of a depth greater than that of the sides. Thus, when stacked one above the other, there is a small but very essential air space between the compost and the base of the box above it. Alternatively, blocks or bricks are placed between the trays when stacking.

Pasteurisation of Compost

Pasteurisation, or "peak heating" as it is known among growers, has several objects. Insect and other pests which may have survived composting are destroyed or driven to the surface, where they can be eliminated by fumigation. Most disease organisms are also susceptible to pasteurisation temperatures. Equally important is the conditioning effect of correct pasteurisation which really amounts to a continuation of the composting process under controlled conditions, so that the right type of aerobic fermentation is encouraged.

Owing to the compactness of the trays when stacked for pasteurisation, little additional heat is usually needed to reach the required temperature of 130° to 140°F. This may be provided in the form of live steam injected into the house, or by steam pipes if the moisture content of the compost is already high.

The temperature is maintained at pasteurisation level for 12 to 24 hours or even longer, according to the condition of the compost, and during this time careful ventilation is given at frequent intervals. Circulating fans ensure even temperatures in trays at different levels and the moisture content is adjusted by the judicious use of live steam or pipe heat.

The Spawning Operation

Spawning is done as soon as the temperature of the trays has dropped below 80°F. Grain spawn is most commonly used for tray cultivation, for the reason that it may be simply broadcast over the surface of the compost, and under good conditions it provides rapid mycelial growth and early cropping. The air spaces between the trays enable spawning to be carried out without unstacking. A flat spade-like tool can be inserted between the trays and the grain shaken off on to the compost. Many growers, however, still prefer the old method of planting the spawn to a depth of one to one and a half inches; in such cases, unstacking and restacking is often unavoidable.

Shelf beds in production in a specially constructed mushroom house.

About 14 days' incubation in the heat room at 70° to 75°F. is given after spawning. There is no need for much ventilation during this period, but a close watch must be kept on temperatures as the trays may heat up owing to renewed fermentation, especially if they have been disturbed during spawning. Vigorous spawn growth can also cause a rise in temperature even to the extent of destroying the spawn itself. A very moist atmosphere is believed to be beneficial during the spawn growing period and the floors and walls are kept well damped down.

A crane-operated grab feeds the manure on to a turning machine during the composting process.

Casing

By the end of two weeks, the compost is fully run with spawn and the trays are ready to be moved to their cropping quarters. Roller conveyors are set up between pasteurising chamber and cropping room and the trays are cased *en route* with an even layer of soil, or other casing material, to a depth of one inch. Evenness of depth is important, for without it correct watering is difficult and irregular cropping may result.

As an alternative to soil, a mixture of moistened peat and chalk has recently become popular. Many growers find this more easily handled and report yields higher than those obtained with soil. Less trouble is to be expected from disease, but it is doubtful if the mushrooms equal the quality and size of those produced from a casing soil of suitable texture.

Cropping

On arrival in the cropping room, the trays are stacked in double lines after the fashion of open brickwork, the end of each tray being supported by the ends of the trays on either side in the row below. From this time onwards, special attention is paid to the conditions under which the crop is brought into production. The temperature of the house is maintained at a level of 58° to 60°F., efficient but controlled ventilation being given. Growing mushrooms produce carbon dioxide and other waste products, the accumulation of which, even in relatively low

Above: **Trays of compost pass into the heat room on roller conveyors.**

Right: **Trays are stacked in the heat room ready for pasteurisation. Steam heated gilled piping is used as a source of dry heat.**

A casing machine of the American type used to apply a layer of soil to the trays as they pass on roller conveyor into the cropping room.

concentrations, can have an adverse effect on quality.

Watering is of particular importance as it can exert a great influence on the final yield and on the size and quality of the mushrooms produced. The first watering is given with a fine spray lance as soon as the trays are stacked in their cropping quarters. This, together with a second application the following day, is designed to make the soil uniformly moist, but not wet, down to the compost. The same degree of moisture is maintained by further very light applications at intervals of two to three days until pinhead mushrooms are formed and emerge above the surface of the casing, when heavier watering is necessary.

Excessive applications of water at the wrong stage may have serious consequences in that they can damage the young and delicate mushroom mycelium as it enters the casing or may destroy tiny newly-formed pinhead mushrooms. Too little moisture, on the other hand, encourages vegetative growth at the expense of mushroom production.

The first mushrooms are picked between two and three weeks after the trays are transferred from the heat rooms and are cased. Thus approximately five weeks must be allowed between spawning and cropping and six from the date of filling the trays ready for pasteurisation.

Under normal cultural conditions, mushrooms appear in flushes or waves, usually at intervals of 10 to 14 days. The first flush is usually the heaviest and may yield from ¾ lb. to 1 lb. mushrooms per square foot of cropping area. As the crop progresses, flushes are less well defined and mushroom production becomes more or less continuous. For intensive tray production, a six week cropping period is normal, although eight or even nine weeks is allowed on some farms. During this time, picking is a daily operation and a total yield of up to 2 lb. per square foot may be reaped before the trays are removed from the cropping rooms to make room for a further batch which, meanwhile, have been incubated in the pasteurising chamber.

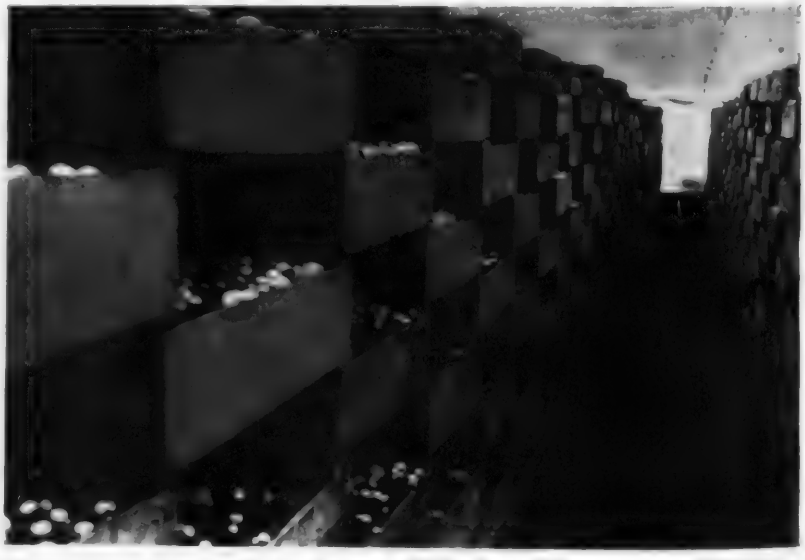
Thorough disinfection of the rooms before refilling is essential, particularly if disease has been present in the previous crop. This is usually achieved with a combination of formaldehyde and heat —again in the form of live steam.

The grower must be constantly on his guard against both disease and pests, either of which can build up to serious proportions in an alarmingly short space of time. Inadequate disinfection or bad farm hygiene, for example, may result in a "carry over" of disease from one crop to the next in the same house or to another in an adjoining cropping room. Trays, too, can harbour infection, which in certain circumstances may survive pasteurisation temperatures.

Emptying, disinfection, and refilling is done as quickly as possible to make maximum use of the cropping space available. According to the cropping period allowed, up to six crops per year can be taken from each room.

Advantages of the Tray System

Under certain conditions, the tray system offers many advantages. Undoubtedly, the



Trays coming into production in the cropping room.

greatest of these is the extent to which mechanisation is possible, labour representing a substantial proportion of the total cost of production on any mushroom farm. For maximum economy in labour, production on a fairly large scale is essential for the maintenance of a continuous cycle of operations, keeping labour and machinery in productive employment. Further, from the economic standpoint, an intensive schedule of five or six crops per annum is infinitely preferable to three or four, always provided that such intensification is not achieved at the expense of good husbandry.

Few British growers can hope to achieve the high degree of efficiency made possible by extensive mechanisation, as most of them operate on too small a scale to justify the cost of expensive machinery. Nevertheless, the system has a great deal to recommend it. Many growers, for example, find efficient pasteurisation difficult or even impossible, particularly where glasshouses, caves, or cellars are used. Such places, however, are ideal cropping quarters and can be supplied with trays ready to come into production from one central heat room where they have been properly pasteurised and thus are free from disease and pests.

The tray system makes maximum use of the accommodation available. In a given mushroom house, as much as 50 per cent. greater cropping area is sometimes obtainable with trays than is possible with shelf beds. Further, up to six crops per year are possible as against a maximum of three on shelves.

Greater economy is claimed by some in the use of horse manure, but in this respect fair comparison is difficult owing to the different depths of compost used in the various systems and the length of time for which they are allowed to crop. Shelf beds, for example, are often eight or nine inches in depth and may be allowed to crop for 12 to 14 weeks. Despite this longer cropping period, the yield per ton is not always as high as from trays laid to a depth of four to five inches and cropped for seven to eight weeks.

Undoubtedly the tray system has many advantages over other methods of culture, but, like most innovations, it is not without its pitfalls. To give of its best, it must be operated intensively; this necessitates close adherence to a fixed schedule. The vagaries of heating and mechanical handling equipment, variations in manure supplies, to say nothing of Mother Nature herself, often conspire to defeat this object. The capital cost of effective mechanisation is high, and depreciation of heat rooms and certain pieces of equipment tends to be rapid. Small cultural disadvantages also exist. Watering, for example, requires even more skill and attention than on shelf beds, while the ventilation of trays during cropping can present a problem. It will be evident that choice of this system must depend not only upon the depth of the grower's pocket, but also upon his cultural skill and his readiness to accept a task which will demand unremitting care and attention.

The tray system represents the present stage in the evolution of the mushroom industry from the crude and haphazard methods of Tournefort in the 18th century. Whether this system is the last word in development, or whether further innovations will be forthcoming, rendering it antiquated in its turn, only the future will show.

SUPPLIERS OF EQUIPMENT

Miscellaneous mushroom culture equipment: *W. Darlington and Sons.*
Boilers and heating installation: *Burgess and Co. (Bracknell).*
Baby tractors, trucks, and trailers: *Wessex Industries (Poole).*
Circulating fans: *Keith Blackman.*
Supplements: *Adco.*

The photographs are published by courtesy of W. Darlington and Sons.

The Protein Story

THE gap between the highly specialised "Recent Advances" and "Annual Review" series, written for the practising expert, and the text-book, has been bridged by a recent work,* the object of which is to present a comprehensive, integrated account of the chemical, physical, and biological properties of the proteins, for the benefit of the advanced student and all those workers trained in different disciplines who are entering the field in fairly large numbers.

As is pointed out in the preface, although the proteins have been under active investigation for over a century, progress throughout this period has not been at all uniform. Advances had to wait upon progress in the cognate fields, and the invention of new techniques. The recent flood of progress has been occasioned by the general availability of new tools, enabling the problems to be attacked, with considerable success, from many directions. The treatise is largely aimed at those workers from other fields who have come to the aid of biochemists, chemists, physicists, biophysicists, and biologists, to provide them with the accumulated knowledge on which to base their own advances.

Specialisation within the field of biochemistry has led to such a divergence of interests, even among those trained within a single discipline, that this work will be of great benefit in this respect also. For example, a number of biochemists, already specialists within a specialised field, are tackling the problems of proteins from such widely differing viewpoints that they scarcely talk the same language. Thus, while some investigate their chemical structure, others measure the nutritional value of proteins; muscle metabolism is far removed from the study of the extraction of biologically active proteins from natural sources. These different groups have little need to co-operate and often little interest in the work of the other groups, but all rely upon a vast fund of fundamental knowledge of the chemistry, physical nature, and biological properties of the proteins. Much of this essential knowledge is collected together in these volumes.

The plan of the book follows the modern style of symposia, each chapter being contributed by a different specialist. This has the advantage of expert and authori-

* *The Proteins.* Edited by Hans Neurath and Kenneth Bailey. Vol. I, Parts A and B. Pp. 1115. Academic Press. Part A price $12.00; Part B price $13.00.

tative appraisal and the disadvantage of lack of cohesion, balance, and uniformity. Nevertheless, this procedure has become inevitable if an authoritative account is wanted in any field, especially one of this size and rate of growth.

The complete set of these two volumes will provide a more or less adequate library on the subject. The first volume in its two parts consists of 1,000 pages, and includes 3,500 references. If a whole shelf of books on the subject can be replaced by this small set, this alone would justify the rather high cost, not to mention the convenience and the avoidance of duplication.

Volume I covers the chemical and physical properties of the proteins, their biological activity, and a review of the methods involved. Part A discusses their isolation and amino acid composition, the general chemistry of the amino acids and peptides, structure, optical, and electrochemical properties. Part B includes the shape of the molecules, protein interactions, denaturation, chemical modifications, and the relation between structure and biological activity.

As will be evident from the relatively small number of subjects dealt with, each is discussed at full length and in reasonable detail: the chapter on structure and configuration by Low is almost a book in itself.

So large a volume cannot be reviewed in detail, but a few points may be considered. It is odd that in an admittedly brief review of the biosynthesis of proteins by Desnuelle, no mention is made of the nucleic acid template suggestion of Dounce. This by itself may not be worthy of comment, but a recent review devoted entirely to this subject also joins this conspiracy of silence.

The chapter by Doty and Geiduschek on optical properties collects together information on refraction, dispersion and flow bi-refringence, ultra-violet and infra-red spectra, and photochemistry.

The brief chapter by Porter reviews the relation of chemical structure to the biological activity of proteins. He shows that attempts to relate biological activity with gross chemical or physical properties have failed, and that only very general conclusions can be drawn. The picture is complicated by the probability that the biological activity of the "active centre" is in some cases dependent upon the structure of the whole molecule, while in other cases it is likely that this is not so.

This book, to be followed by a second volume also in two parts, should meet with great success.—A. E. B.

Vegetable Fats and Oils

THE American Chemical Society is to be congratulated on persuading Dr. E. W. Eckey to write a monograph* on vegetable fats and oils. Many books have been written on this subject, but with the exception of the standard treatise by Lewkowitsch ("The Chemical Technology and Analysis of Oils, Fats, and Waxes"), which is now out of print, no volume has been entirely satisfactory. Dr. Eckey does not cover such a wide field as did Lewkowitsch, but his work is one of the most comprehensive on the subject to appear in recent years.

The book is arranged on a botanical basis with a biochemical bent, and there are initial chapters dealing with the chemical composition of fats, their physical and chemical properties and reactions, as well as their biochemical and nutritional aspects.

A very interesting chapter on the genesis of fats and oils in plants has been written by Dr. Miller, while subsequent chapters are devoted to the different botanical groups, including bacteria and algae. In this manner, it is comparatively simple to compare the oils obtained from different members of the same botanical family, although the usefulness of the work would be increased if comprehensive tables of the constants, colour reactions, and fatty acid composition were given for fats of each botanical group. Had an attempt been made to do this, some of the weaknesses of the work would have been demonstrated before publication. As an instance, the reference under kapok oil mentions that it gives a stronger Halphen test than does cottonseed oil. No reference is made to the Halphen test under cottonseed oil, or under the oil of *Sterculia foetida*, which also gives a positive Halphen test. No reference is given to this test either in the index or in the chapter on the chemical properties and reactions of fats.

The general style of writing is lucid and interesting. References are given to the work of European, including British, chemists in a much more generous manner than is frequently to be found in works of American origin.

This work should be on the library shelf of every laboratory or works concerned with vegetable fats and oils, and can be depended on to supply useful information whenever it is consulted, but it is to be hoped that the appearance of a second amplified edition will not be long postponed. The reviewer agrees entirely with the publishers' claim that this book "will be the fundamental reference work in this field," but it is for this very reason that it is all-important that the subject matter should be the more fully collated for reference.—T. McL.

* *Vegetable Fats and Oils.* By E. W. Eckey, with a chapter by L. P. Miller. Pp. ix + 838. Reinhold Publishing Corporation (Chapman and Hall). Price 132s. net.

The Leonard Hill Technical Group

Articles published in some of the associate journals in the Leonard Hill Technical Group this month include:

Chemical & Process Engineering.—Stirrer Efficiency.

World Crops.—Rice Industry in British Guiana; Insecticidal Lacquers.

Manufacturing Chemist.—Protection against Radiation by Means of Chemical Agents; Estimation of Volatile Acids in Cough Mixture.

Corrosion Technology.—Painting for the Protection of Outdoor structures; Hot Dip Galvanising.

View from the upper floor of the Anton Rauch flour mill.

The Food and Agriculture Groups in Austria

Innsbruck, in the French zone of Austria, was the centre chosen this year for the annual Tour of the Food and Agriculture Groups of the Society of Chemical Industry. The majority of the 42 participants and their guests travelled from London by air, and the whole party was accommodated in one hotel near the old part of the town. Full advantage of the Sunday was taken to explore the town and the country in the immediate neighbourhood, most members climbing above the snow line on the mountains overlooking the Inn valley.

THE first meeting took place on Monday morning, May 24, when Dr. O. Ripl, the director of the *Bundes-Anstalt für Lebensmitteluntersuchung*, welcomed the members and introduced Dr. J. Gmachl-Pammer, the Head of the Laboratories of the Public Food Analysts' Institute. Dr. Gmachl-Pammer then read a paper on the development of the food industry in the Austrian Tyrol and described the original local resources of the district, leading to the development of industry generally. Brewing and milling firms had been established in Innsbruck early in the nineteenth century and among others of long standing were dairies, bakeries, and mineral water manufacturers.

There were also confectionery and oils and fats concerns, and large and small spirit distillers, all of which now gave employment to some 1,500 people. There was also a salt industry which had been in existence for over 1,000 years. Following a vote of thanks by Dr. J. H. Bushill, chairman of the Food Group, a tour of the laboratories was made, during which members took full advantage of the opportunity for discussion with Dr. Ripl and the members of his staff.

Preserved meats and savouries are well in evidence on Tyrolean tables, many of these coming from Dr. A. Hörtnagl's premises in Innsbruck. Over 50 varieties of preserved meats are prepared; the majority, of the smoked variety, include *wurst* of many shapes and sizes; others are in the form of canned savoury pastes.

The meat preparing rooms, the chopping and mixing machines, and the installations for boiling and smoking the products were all inspected, one speciality product, described as a "Meat Cheese," prepared from veal, attracting particular attention. The judicious use of spices is a feature of the preparation of the preserved meats.

Later in the day the sweet and flour confectionery firm of the Gebrüder Walde was visited, when members were able to observe the manufacture of a variety of products, including jellies, boiled sweets, toffees, and chocolates, chocolate biscuits, and several kinds of speciality spiced biscuits.

In the evening members were received at the Hochhaus by the Deputy Landehauptmann of the Tyrol, Herr J. A. Meyr, the Bürgermeister of Innsbruck, Dr. F. Greiter, and the President of the

Herr Toni Rauch welcomes the party at the Anton Rauch flour mill.

Innsbruck Chamber of Commerce, Herr Miller. The expressions of welcome from Herr Meyr and a message from the University were responded to by Dr. Bushill.

On the following day, Herr Toni Rauch and his colleagues conducted members round the Anton Rauch flour mill at Innsbruck-Mühlau. The present buildings replaced those which had been operated continuously in the locality for over a century. Most of the flour, produced from American, Canadian, and Austrian wheats, is consumed in the Tyrol.

A coach journey in the afternoon carried the party to Ötzthal, where the fruit utilisation and cold storage station of the *Landwirtschaftliche Genossenschaft* is located. Wines and spirits, and apple juice from locally grown fruit are prepared. During the previous season, 25,000 gallons of juice were handled, facilities for bottling and storage being available. Cold storage for four million eggs and over 110,000 lb. of other produce is also available.

En route to and from Ötzthal brief halts were made to enable members to see the waterfall at Umhausen and the historic Cistercian abbey at Stams. Dinner was taken at Ötz on the return journey; during the meal a programme of local set dances and traditional songs was provided by an enthusiastic group of amateurs.

On the next day, the Director, Dr. O. Wassermann, and Mrs. Wassermann, with members of their staff, welcomed the party at the *Bundes-lehr- und Versuchanstalt für Hartkäserei* at Rotholz, to the east of Innsbruck. A tour of the cheese production rooms and the research laboratories, as well as of the students' residential quarters and the school premises, was made even more enjoyable by the fresh milk, cheese, new bread, and butter served in the refectory. Most of the buildings are of recent construction in the local country style and the surroundings are typically of the Tyrolean countryside. The school for master cheesemakers has been in existence for over 75 years and the new premises and the facilities they provide will be of direct assistance to the local agricultural economy. The main cheese produced are Emmenthaler and Tilsiter.

The luncheon at Rotholz which followed was at the invitation of Dr. E. Gschleisser, Area Director of the Association of Austrian Industries. The Vice-President of the Association, Dr. E. Fischer, expressed the pleasure of his organisation on the occasion of the visit of the Food and Agriculture Groups to the Tyrol, and Dr. Bushill replied.

The afternoon was spent at Jenbach in the modern hydro-electric power station at the foot of the

Members of the Tour assemble at the Gebrüder Waldo.

Achensee, where sufficient power is generated to meet the requirements of the district, and at least as much again is available for export to Germany and Eastern Austria, the total annual output being about 600 million KVA. A short trip on the lake in one of the *Achenseekraftwerk* steamers at the end of the visit concluded the day.

A road tour through Brenner to Cortina-Ampuzzo (where preparations for the winter sports for the 1956 Olympic Games are being made) and to the Dolomites in good weather on the following day, afforded an opportunity of seeing the towns and villages in holiday mood. On May 28, the first morning visit was to the "Etab" Teigwarenfabrik of the *Tiroler Konsumunggenossenschaft*, Innsbruck. Here macaroni, noodles, spaghetti, and other similar products are manufactured. Modern machinery is installed, and the products are attractively packed for retail sale. Three grades of macaroni, the first containing egg, are produced.

The party then visited the establishment of G. Schindler and Co., producers of fruit preserves and spirits. A wide variety of jams is made, mainly from imported pulp received from all parts of Europe. Large jars containing several pounds, as well as smaller ones, are popular, enabling the country folk to lay down winter stores economically. The sampling of the wines and liqueurs (many of which are exported, some to the United Kingdom) was enjoyed in the appropriate surrounding of the cellars.

The final visit was to the *Bürgerliche Brauhaus*, one of the two main brewing firms in Innsbruck. Here the cool lager cellars were again welcome, the afternoon being hot. The visit concluded with an inspection of the automatic bottle washing and filling plant and an informal meal of bread, cheese, sausage, and beer.

In the evening the Farewell Reception of the Tour was held at the Hotel Europa in Innsbruck. Dr. and Mrs. Bushill received Herr Meyr, Dr. Greiter, representatives of the Chambers of Commerce and Agriculture, and of the institutes and firms visited, together with their ladies. During the evening, Dr. Bushill expressed the sincere thanks of the Food and Agriculture Groups to the representatives. Well-earned thanks were also expressed to the energetic Honorary Organising Secretary, Mr. J. A. Beesley, who had for this occasion not only to arrange the Tour Committee's programme but also to ensure that at no stage did language difficulties interfere with the arrangements. The success of the reception, no less than that of the Tour, bore gratifying testimony of this.

For the main returning party a week of perfect weather ended abruptly in grey cloud and drizzle at Heath Row on the afternoon of May 29. The offer of the BOAC officer, of transit facilities for Shannon, Gander, or New York, had to be refused—we were home. Perhaps some of us felt slightly wistful at the thought of the sunshine such a little distance away.

Those who participated in this year's Tour were: Dr. and Mrs. A. J. Amos; Mr. J. A. Beesley; Mr. and Mrs. W. Birch; Mr. and Mrs. F. K. Birkett; Mr. A. P. Buchanan; Dr. and Mrs. J. H. Bushill; Mr. and Mrs. S. W. Butterworth; Mr. W. G. Carey; Mrs. H. E. Cox; Dr. and Mrs. J. G. Davis; Mr. R. De Giacomi; Dr. C. G. M. de Worms; Mr. and Mrs. W. Dixon; Miss G. H. Donald; Dr. and Mrs. G. M. Dyson; Dr. H. Egan; Dr. and Mrs. N. Evers; Mr. C. M. Keyworth; Mr. and Mrs. T. McLachlan; Mr. and Mrs. H. C. Moir; Mr. and Mrs. R. Harold Morgan; Dr. and Mrs. J. H. Oliver; Mr. D. G. Pirie; Mr. and Mrs. H. Pritchard; Mr. W. A. Whitley; Mr. and Mrs. J. B. Wilton; and Dr. R. C. Wright.

New Flavouring Material for Ice Cream

RESEARCH on a recently developed flavouring adjunct known as Vanitrope (propenyl guaethol) has been carried out by the Maryland Agricultural Experiment Station.

Vanitrope, a pure chemical, consisting of a fine, free flowing, white powder, has a rich, sweet, delicate aroma and a pleasant vanilla-like taste. It appears to stimulate the sense of taste as well as contribute to the flavour effect. Its flavour strength is very high and its cost at use levels is less than that of vanillin.

The new agent has been evaluated on the basis of its flavour strength equivalent and quality of its odour and flavour in comparison with natural vanilla extract, vanillin, ethyl vanillin, and coumarin by Tyler.[1] Tyler found that, compared with vanillin crystals, ethyl vanillin and coumarin were three times as strong and Vanitrope 20 times as strong, while vanilla extract, judged as excellent quality, was about $\frac{1}{10}$ the strength. This reference indicated that the use of excessive amounts of Vanitrope must be avoided, otherwise an unpleasant, medicinal taste occurred. It was used in the preparation of extracts with a vanilla-like flavour by (*a*) combining it with vanilla and vanillin to provide a very high quality flavour; (*b*) replacing a portion of vanillin to give a less expensive but more vanilla-like flavour than that of either vanillin or ethyl vanillin alone.

Tyler showed that Vanitrope had certain solubility limitations. It was sparingly soluble in water, the presence of even small quantities of water in other solvents reducing the solubility of Vanitrope in them. It was 10 per cent. soluble in 95 per cent. ethanol, 4 per cent. in anhydrous propylene glycol, and could be added directly to fats or essential oils.

Cartwright[2] studied the solubility and volatility of vanilla-like synthetics and found the solubility of propenyl guaethol, in per cent. by weight at 24°C., was 0·002 in water, 0·54 in 50 per cent. ethanol by weight, 16·7 in 100 per cent. ethanol, 0·11 in 50 per cent. propylene glycol by weight, and 4·00 in 100 per cent. propylene glycol.

Cartwright and Kelley[3] studied the flavour strength of propenyl guaethol in comparison with vanillin, ethyl vanillin, and coumarin, using pure vanilla extract as a standard of reference. They concluded that propenyl guaethol had 20 times the flavouring strength of vanillin and that a blend of propenyl guaethol and vanillin most resembled pure vanilla extract in flavour quality.

The purpose of this investigation was (*a*) to study methods of incorporation of Vanitrope into ice cream mix as a flavouring material; (*b*) to study by organoleptic examinations the flavour characteristics imparted to ice cream by its use.

It was introduced into ice cream

in combination with vanillin, vanillin and natural vanilla extract, and with natural vanilla extract. These preparations were used in various strengths to determine the concentration required to produce desirable flavour characteristics in vanilla ice cream. Various amounts of Vanitrope were added to chocolate and different fruit and nut ice cream to determine its value as a flavouring for these products.

The results indicate that the product can best be introduced into the ice cream mix just previous to or at the time of mix pasteurisation. It can be added to the mix in a flavouring formula as a 1:7 or 1:20 ratio of Vanitrope to vanillin or as Vanitrope with natural vanilla extract. It can be prepared for use as a 2 to 4 per cent. solution in a suitable solvent, the most suitable being propylene glycol, Tween 60 SD, butter oil, coconut oil, and corn oil.

Flavour observations indicated that 16- to 22-fold strength preparation of Vanitrope and vanillin (1:7 ratio) produced more desirable flavour characteristics than either weaker or stronger preparations.

The results of panel observations of ice cream flavoured with natural vanilla, Vanitrope alone, Vanitrope plus natural vanilla, Vanitrope and vanillin (1:7 ratio), and Vanitrope and vanillin plus natural vanilla indicated that Vanitrope, blended with vanillin or natural vanilla, produced a desirable, mild pleasant flavour.

These observations indicated that the use of Vanitrope enhanced the flavour imparted to vanilla ice cream by vanillin or natural vanilla extract. Desirable flavour characteristics were obtained when 10 per cent. of the natural vanilla requirements were used in combination with Vanitrope. Used in excessive amounts, it produced off-flavours.

When Vanitrope was used in chocolate and different fruit and nut ice cream, including strawberry, raspberry, pineapple, butter pecan, butter brickle, and butterscotch, the results indicated that it had a greater influence in enhancing the flavour of the nut and butter-type ice cream than that of the fruit flavours studied.

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Income Tax and Machinery

THE rate of the investment allowance under the Finance Bill is 20 per cent., the same as for the initial allowance and it is granted for expenditure after April 6, 1954.

The initial allowance will still continue to be granted for capital expenditure on used and second-hand machinery or plant and also on new road vehicles, unless they are of a type not commonly used as private vehicles and unsuitable to be so used, or are provided wholly or mainly for hire to or for the carriage of members of the public in the ordinary course of the trade.

The main difference between the investment and initial allowances is that the investment allowance is not taken into account in calculating other wear and tear allowance, whereas the initial allowance is. The investment allowance is therefore a tax-free bonus.

Initial allowances for wear and tear, for the purposes of income tax, were restored by the provisions of the Finance Act, 1953, in respect of capital expenditure on machinery or plant incurred on and after April 15, 1953.

The initial allowances were suspended in respect of expenditure incurred on and after April 6, 1952; previously they had been granted for expenditure incurred on and after April 6, 1946, and in special circumstances, for expenditure incurred on and after April 6, 1944.

The allowance was restored at 20 per cent. From April 6, 1949, to April 5, 1952, it was 40 per cent.; prior to April 6, 1949, it was 20 per cent.

Both the investment allowance and the initial allowance are granted in respect of expenditure incurred, thus if machinery or plant is acquired on hire purchase terms, the allowances will be granted as and when the deposit and instalments are paid. They are granted for the income tax year in the basic financial year of which the expenditure is incurred.

For example, if a trader buys new machinery or plant for £1,000 on September 1, 1953, and prepares financial accounts for his normal financial year to March 31, 1954, these accounts will be the basis of assessment for the income tax year 1954-55 and in that income tax year he will be granted an initial allowance of 20 per cent. of the expenditure, that is £200.

If he had acquired the plant and machinery on hire purchase terms, paying £400 deposit and £50 per month for 12 months, by March 31, 1954, he would have paid the £400 deposit and six instalments of £50, a total of £700. The initial allowance for the income tax year 1954-55 would be 20 per cent. of £700, that is £140, and as the remaining six instalments will be paid in the year to March 31, 1955, and assuming they are paid after April 6, 1954, the investment allowance for the income tax year 1955-56 will be 20 per cent. of £300, that is £60.

If a trader buys new machinery or plant for £1,000 on May 1, 1954, and prepares accounts to March 31, 1955, he will be granted an investment allowance of 20 per cent. of £1,000 in 1955-56. This investment allowance will not be deducted in computing the written down value for future allowances.

The hire purchase interest is an allowable charge and has been ignored in the example.

FUTURE ARTICLES

AMONG the articles to be published in forthcoming issues of FOOD MANUFACTURE are the following: "The Higher Alkyl Gallates," "The Lobster, Part II," "Processed Foods," "Dried Pineapple from Kenya," and an illustrated description of a jam factory.

The Lobster

Part I

Elliot B. Dewberry, M.B.E., F.R.San.I., F.R.I.P.H. & H.

In the first part of this series of articles the author describes the distribution, food value, habits and life history, fishing season, and storage of the lobster. Part II will be concerned with the lobster canning industry and processing methods.

AMONG the several species of lobster, from a commercial point of view the European and American are the most valuable and economical of all the edible ones.

The European lobster (*Homarus vulgaris*) abounds in the coastal waters around the British Isles and the western coast of Europe, from Norway to the Mediterranean. It does not inhabit the Baltic and is not common in the Mediterranean, being limited in its eastern range by the Adriatic Sea.

Distribution

In England the largest number of lobsters are landed in the Northumberland sea fisheries district, the north-eastern and eastern districts occupying second and third places respectively. On the west coast, large catches are made in the Lancashire and western districts, considerable quantities also being trapped in the shallow waters around the south coast, and in the Cornwall, Devon, and Sussex districts.

Lobster fishing in Scotland takes place in the waters off the Outer Hebrides, Orkney and Shetland, east coasts of Caithness, Berwickshire, and the west coast of the Scottish mainland.

The Norwegian lobster fisheries are situated around the Skagerrak coast in the south and along the west coast as far north as the Trondheim Fjord, the exporting centres being Kristiansand, Stavanger, and Bergen.

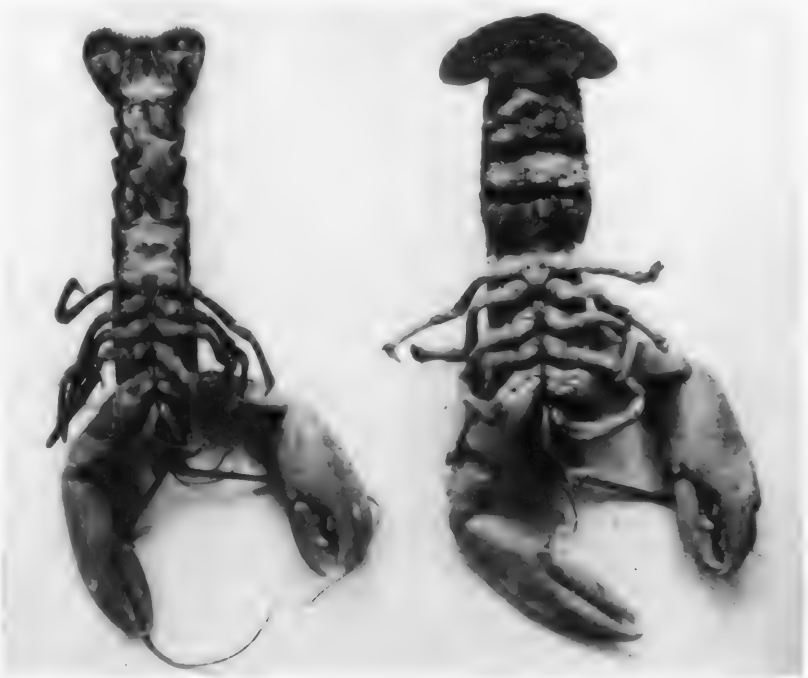
Among other European species is the Norway lobster (so-called) or Dublin prawn (*Nephrops norvegicus*) which inhabits the deep waters of the Irish Sea (N.E. Ireland), the North Sea, and the coastal waters around Norway. It is smaller than the common lobster, has slender claws, and is mainly orange in colour, marked with red and white.

Another species is the spiny or rock lobster, or sea crawfish (*Palinurus vulgaris*), which is reddish chocolate in colour, mottled with brown and white, and distinguished by its prickly carapace. It inhabits the waters around the south and south-west coasts of England and Ireland and is common off the French coast and in the Mediterranean. The rock lobster is not much used for food in Britain, although it is esteemed a delicacy in France. European lobsters are marketed in the live condition only, as there are no canneries in Great Britain or Norway.

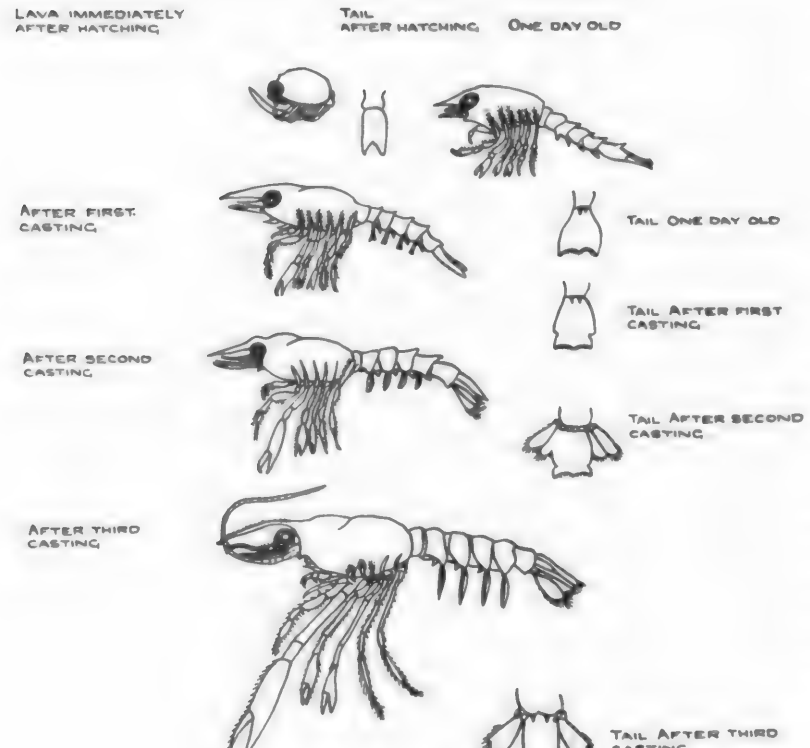
The American lobster (*Homarus americanus*) inhabits the waters of the Atlantic Ocean on the eastern coast of North America, from the Straits of Belle Isle (Labrador) to Cape Hatteras. Its vertical distribution varies from less than one to over 100 fathoms.

The most important fisheries are situated off the shores of the Canadian Maritime Provinces, *viz.* Nova Scotia, New Brunswick, Prince Edward Island, and Quebec, where thousands of men are employed during the fishing season. Considerable improvements have been introduced into the industry, owing in part to the educational efforts of the Biological Board of Canada. Research stations were set up at Halifax, Nova Scotia, and St. Andrews, New Brunswick, at which the causes and remedies of spoilage of canned lobster and other matters connected with canning were investigated. These investigations contributed considerably towards raising the quality of the product.

The annual catch of lobsters in Canada's waters amounts to some



The male (*left*) and female lobster.



Stages in the development of the lobster magnified five times.

30 million pounds or more. At one time, the greater part of it was canned, but in recent years more and more of the catch has been marketed live, about 50 per cent. being canned at the present time. There is a considerable export trade in live lobsters with the United States of America, where Portland, Boston, and New York are the most important lobster-importing markets.

The South African Cape rock or spiny lobster (*Jasus lalandii*) abounds in a restricted area along the south-western Cape coast in the clear waters of the Antarctic current, and is one of the Union's important and valuable export commodities. In recent years, a great deal of care and attention has been given to the canning of lobster tails and also to the trade in fresh frozen tails, both these commodities being imported by the United Kingdom.

Food Values

History relates that the common lobster has been esteemed a delicacy and regarded as the king of crustaceans, doubtless on account of its delicate flavour, abundance, and economic value. It was referred to in the writings of Aristotle and Pliny and by the Roman historians in their descriptions of epicurean feasts.

In the tables are given the nutritive value and chemical composition of fresh and canned lobster respectively.

The total quantity and value of lobsters of British taking landed in England and Wales during the past three years was:

	Number	*Value £*
1950 ..	7,053	106,008
1951 ..	7,018	122,610
1952 ..	6,717	123,607

The total quantity and value of canned lobsters imported into the United Kingdom from Canada and other countries during the same years were as follows:

	Quantity Cwt.	*Value £*
1950 ..	2,550	160,830
1951 ..	3,978	247,527
1952 ..	2,691	168,726

Habits and Life History

The lobster lives and feeds in comparatively shallow water where the nooks and crannies of the sea bed afford suitable protection. It is an agile, pugnacious animal with a keen sense of smell, taste, and touch. It is migratory, only to the extent of moving to and from the shore, such movements being governed by the abundance of food and the temperature of the water. It does, however, undertake seasonal migrations and moves off-shore into deeper water on the approach of winter, returning in-shore in summer.

Belonging to a group of animals characterised by the strong shell-like armour (chitin) encasing the body and limbs, the lobster is thin and soft at the joints, allowing free movements of the parts. The shell not only protects and supports the internal organs, but also affords points of attachment for the muscles. The forepart of the carapace (the shield covering the head and chest region) is formed into a short rostrum or beak, which has about four teeth on each side. The eyes, set on movable stalks, can be turned in every direction.

Attached to the forepart of the body are the four pairs of walking legs and in front of these a large pair of powerful claws which are not alike in shape or size. The large claw, with its fingers armed with blunt knobs, is adapted for

	Water per cent.	*Protein N × 6·25 per cent.*	*Fat per cent.*	*Carbo-hydrates per cent.*	*Ash per cent.*	*Calories per lb.*
FRESH LOBSTER						
Edible portion:						
Min.	68·6	11·6	1·5	—	1·6	345
Max.	84·3	25·4	2·5	0·9	4·0	555
Average	79·2	16·4	1·8	0·4	2·2	390
Whole lobster:						
Min.	18·0	4·4	0·5	—	0·6	115
Max.	47·2	6·7	0·9	0·4	1·0	165
Average	30·7	5·9	0·7	0·2	0·8	140
CANNED LOBSTER						
Min.	76·2	16·7	0·5	0·5	2·1	345
Max.	79·4	19·5	1·7	0·6	2·8	445
Average	77·8	18·1	1·1	0·5	2·5	390

crushing small shell-fish, while the smaller claw has the inner edges of the fingers sharp and set with claw-like teeth for holding or tearing its prey. The male lobster has larger claws than the female.

The hind portion of the body is in six flexible segments, each having beneath it a pair of fin-like limbs termed "swimmerets," the last pair forming the broad fan-tail. Although the lobster is enclosed in shell-like armour, it is sensitive to changes of temperature and the sense of touch is not impaired, the minute hairs of various sizes all over the body and limbs detecting any slight movements and vibrations in the surrounding water. When travelling over the sea bed, the lobster walks on the tips of its slender legs (aided by the paddling of the swimmerets), holding the nipping claws raised in front, at the same time waving its antennae aloft and turning its protruding eyes in every direction. When seeking a suitable crevice in the rock, the preliminary examination is made with the long antennae, the claws being afterwards inserted. When alarmed it opens and shuts its claws and suddenly shoots backwards into the burrow or hide-out by flexing its powerful tail.

The colour of the lobster has a protective significance and varies according to the situation from which it is captured. It is usually a mottled dark greenish-blue to bluish-black on the back, shaded off to red or orange-yellow on the underside. The colour is due to the pigment zoonerythrin which changes to uniform bright red when boiled.

The sex is easily identified, the male or cock lobster being more slender than the female and having larger claws in proportion to the body. The abdomen is five-jointed and has two additional claws or "daggers." The female or hen lobster is generally smaller, the abdomen broader and seven-jointed, and the swimmerets are all of the same type. In the male, however, the front pair differ, being hard, and together form a tube through which passes the sperm to the female for fertilising the eggs.

The fighting habits of lobsters are not confined to their enemies, but they will fight among themselves, often losing their limbs and claws in the fray. A curious feature about the lobster is that it can voluntarily cast its limbs should one of these become injured or seized by an enemy. After a time, a new one commences to grow and further growth occurs each time the animal moults until a perfect limb is formed. Occasionally, malformation of the limb occurs.

Fishermen return from the lobster beds with their catch.

Photo The National Film Board.

Food Requirements

The adult lobster is active at night, exploring and digging up the sea bed in search of food, which consists chiefly of shell-fish (alive or dead), shrimps, starfish, eel-grass, seaweed, etc. Although sometimes termed the scavenger of the sea, it usually prefers fresh to stale food and regurgitates the indigestible or insoluble portions of the food consumed. It captures its prey by stealth; hidden beneath seaweed or sand, or in a crevice in the rocks, it waits until the victim is within striking distance of its claws. The prey is seized between the thumb and finger-like grasp of the large claw and held securely by the small one, while it sucks away at its leisure. It appears to have fairly long intervals between meals but eats ravenously when any food is found and at times devours the eggs carried by the female lobster. These voracious habits doubtless account for its being so easily caught in baited traps.

How the Lobster Moults

The lobster's shell does not increase in size, so to allow for growth the shell is cast entirely at certain periods. Adult cock lobsters moult once or twice a year and hens every two years, usually between the months of April and November. Frequency of moulting is influenced to a certain extent by the temperature of the water and the amount of food available. It is now known that the moulting process is under the chemical control of two small sinus glands situated at the base of the eye stalks. As moulting time approaches, the shell loses its colour and the lobster becomes uneasy and seeks shelter. The soft membrane between the carapace and the abdomen splits and it is through this opening that it gradu-

The lobster trap is prepared. *Photo Fred Magee Ltd., Canada.*

ally extricates itself. By vigorous tugging of the muscles, the body is gradually worked loose. Each of the claws, which is soft and pliable, is withdrawn from its shell, like the hand from a glove. The tail is the last portion to come away, leaving the cast shell and its appendages entire, resembling a dull live lobster. The flesh after moulting has a fresh bright colour but is soft and flabby, rapidly increasing in size by absorption of water. The lobster now diligently seeks food containing lime necessary for the hardening of the newly formed shell.

Recent research has shown that most of the lime salts in the body of the lobster are absorbed into the blood stream and deposited in a pair of sacs termed the gastroliths situated in the walls of the stomach. After moulting, this reserve of lime is used for the hardening of the shell. It takes six to eight weeks for the shell to harden, and during this period the lobster is liable to be attacked by numerous enemies, such as cod, dogfish, skate, ray, shark, and octopus.

Breeding Habits

The hen lobster becomes sexually mature when 10 to 12 inches long, and spawning takes place once every two years. The globular, olive-green to greenish-black eggs, each about $\frac{1}{18}$ in. in diameter, are attached in clusters to the swimmerets. Normally 5,000 to 10,000 eggs are deposited, but a large hen lobster may carry 120,000 eggs. The female remains in "berry" for about 10 to 11 months, during which time the swimmerets are kept constantly waving backwards and forwards cleansing and aerating the eggs as they develop. When ready to hatch, a change in colour occurs, one half of the egg mass becoming a transparent pink to bluish-green colour, while the other half contains the black yolk. Hatching usually takes place during the early summer, but this varies with the temperature of the water pertaining at the time.

Appearance of Larva

The newly hatched free-swimming larva, which is about $\frac{1}{3}$ in. long, differs markedly from the adult lobster. It has a pointed snout, long antennae, and large compound emerald-green eyes containing an iridescent pigment. The body is short, stout, segmented, and shrimp-like in appearance. The abdomen has a row of spines on the back and the telson is forked. Some parts of the body are blue in colour, while others are transparent with reddish spots and the internal organs can be clearly seen. The claws are small, the nipper claws developing after the third week's growth. The larva uses its feathery-like legs as paddles and swims actively on the surface of the sea, feeding on minute animals and plants. It is a pugnacious little animal and develops cannibalistic habits. The larva is exposed to many dangers, its conspicuous colour making it an easy prey for a host of enemies.

Moulting occurs during the second day after hatching. There are two marked periods in the larva's life, the first being the surface-swimming period and the second where the transparent-like appearance disappears, the body becomes darker in colour, the feathery paddles diminish, and the animal more or less resembles the adult lobster. During these main periods, there are several intermediate stages during which the larva moults many times. When about six weeks old ($\frac{1}{2}$ to $\frac{5}{8}$ in. in length) it loses its swimming abilities and sinks to the sea bed where, in course of time, it assumes the habits of the adult; seeking protection from the stones and rocks under which it hides from the attacks of its enemies. The young lobster grows to a length of nine inches in about five to six years.

Fishing Season

Lobsters are in season all the year round, but are considered to be in the best condition during the summer months. They are captured in creels or pots constructed of wicker-work, hemispherical in shape, with a funnel-shaped top. Other patterns have a wooden base with vertical hoops covered with tar netting, with two funnel-

shaped eyes on each side, or at either end, of the creel, permitting entrance to the lobster but preventing its escape. These are baited with pieces of fish, such as hake, cod, mackerel, skate, etc. The creels are sunk to the sea bed, in comparatively deep water, by means of weights and may be shot singly or in fleets of 50, their position being marked by cork floats. Lobsters sometimes weigh as much as 15 lb. each, but the European lobster rarely exceeds 10 lb. Those weighing between ¾ lb. and 2 lb., measuring 9½ to 11 inches, are the most marketable.

Temporary Storage

Lobsters which are not required for immediate disposal can be temporarily stored in wooden containers having holes at the sides and bottoms to allow free circulation of sea-water. The container, which holds about 30 (each with its large claws tied together to prevent injury), is floated in the sea in a sheltered cove or harbour until such time as a consignment is packed for market. For longer storage, large concrete tanks are used into which a continuous supply of fresh sea-water is pumped.

The live lobsters are packed (tails doubled under the bodies) in ventilated stout wooden boxes with close fitting lids, holes for drainage, and fitted with rope handles. Suitable packing material is laid on the bottom of the box, between each layer of lobsters, and across the top, to prevent movement of contents. In some cases, the boxes are lined with greaseproof paper. The packing material, which may consist of wood shavings, dried bracken, peat litter, wood wool, or sawdust, not only prevents movement, but also affords protection to the lobsters against excessive cold or sudden changes in temperature. In hot weather, ice is placed on dry sacking at the bottom of the box and covered with bracken to prevent water from the melting ice coming into contact with the lobsters. It is essential that they should be carefully and securely packed to assure arrival at the markets in first class condition, as their value depends upon this when they are sold.

The Sea Fishing Industry (Crabs and Lobsters) Order, 1951, provides that no person shall land, sell, expose, or offer for sale, or have in his possession for the purpose of sale, any lobster which measures less than 9 in. from the tip of the beak to the end of the tail when spread as far as possible flat; any lobster which is carrying any spawn ("berried" female) attached to the tail or some other exterior part of the lobster, or which is in such a condition as to show that, at the time when it was taken, it was carrying spawn so attached.

The claws of the lobsters are tied together prior to placing in slatted crates for immersion in sea water. *Photo Fred Magee Ltd., Canada.*

(*To be continued*)

Abbreviations

IN the words of the author of a recent book:* "We live in an era of abbreviations, a literary disease for which the only cure is extirpation. Such a course is not likely and therefore the only relief is diagnosis without cure." A valiant attempt has been made at such diagnosis in this extremely useful guide, the first to list so comprehensively the abbreviated designations of both national and international organisations.

Over 2,500 abbreviations of professional, scientific, technological, and commercial organisations are listed. Owing to transliteration confusion, Russian abbreviations have not been included. All foreign abbreviations listed have been translated for the convenience of the reader and in most cases the full postal address is given.

Librarians, information officers, and all who need to know the meaning of such phenomena as SOPECOBA, CETOPES, or DANHORS will find this book indispensable.

* *World List of Abbreviations.* By *F. A. Buttress.* Pp. 261+ix. Leonard Hill Ltd., 9, Eden Street, London, N.W.1. Price 18s. net.

Ministry of Food

LATEST STATUTORY INSTRUMENTS

The list given below is the continuation of the list of Instruments published in "Food Manufacture," May 1, 1954, page 182.

No.	*Date. 1954.*	
		PRICE FIXATION
360	Mar. 28.	Order amending the Seed Potatoes Order, 1953.
385	Apr. 1.	The Milk (Great Britain) Order, 1954. Revokes S.I. 1953, Nos. 726 and 1436.
386	,, 1.	The Milk (Northern Ireland) Order, 1954. Revokes S.I. 1953, No. 727.
471	,, 18.	Order amending the Bacon Order, 1953.
631	May 16.	Order amending the Meat (Prices) (Great Britain) Order, 1953. Revokes S.I. 1953, No. 1409.
632	,, 16.	Order amending the Meat (Prices) (Northern Ireland) Order, 1953. Revokes S.I. 1953, No. 1410.
823	June 25.	Order revoking the Meat (Prices) (Great Britain) Order, 1953, and the Meat (Prices) (Northern Ireland) Order, 1953.
872	July 1.	The Fatstock (Guaranteed Prices) (Marking) Order, 1954.
873	,, 4.	Order revoking the Bacon Order, 1953, the Bacon (Amendment No. 2) Order, 1953, and the Bacon (Amendment) Order, 1954.
		BUTTER
517	Apr. 29.	The Butter Order, 1954. Revokes S.I. 1951, No. 801, S.I. 1952, No. 1718, and S.I. 1954, No. 114.
		CHEESE
518	May 9.	The Cheese Order, 1954. Revokes S.I. 1950, No. 1069, S.I. 1953, Nos. 797 and 1888, and S.I. 1954, No. 115.
		CONDENSED MILK
358	Apr. 1.	Order revoking the Condensed Milk Order, 1953.
		FOOD CONTROL
817	July 4.	Order revoking the Food Control Committees (England and Wales and Northern Ireland) Enforcement Order, 1941, and the Food Control Committees (Constitution) Order, 1943.
		FOOD DOCUMENTS
883	July 4.	Order revoking the Food Documents (Fees) Order, 1943.
		KNACKER'S YARD
856	July 1.	Order revoking the Knacker's Yard Order, 1948.
		LIVESTOCK
760	June 11.	The Imported Livestock (Marking) Order, 1954. Revokes S.R. and O. 1940, Nos. 59 and 1512.
825	,, 27.	Order revoking the Livestock (Restriction on Slaughtering) Order, 1947, and the Livestock (Restriction on Slaughtering) (Northern Ireland) Order, 1947.

No.	*Date. 1954.*	
		MARGARINE
613	May 16.	The Food Standards (Margarine) Order, 1954.
		MILK POWDER
359	Apr. 1.	Order revoking the Milk Powder (Licensing and Control) Order, 1940.
		OILS AND FATS
531	May 5.	The Oils and Fats (Amendment and Revocation) Order, 1954. Revokes S.I. 1953, Nos. 1515 and 1846.
		POTATOES
489	Apr. 15.	The Potato Marketing Scheme (Modification and Suspension) (Amendment) Order, 1954.
		RATIONING
545	May 9.	Order revoking the Fats and Cheese (Rationing) Order, 1953, the Fats and Cheese (Rationing) (Amendment No. 4) Order, 1953, the Fats and Cheese (Rationing) (Amendment No. 5) Order, 1953, the Fats and Cheese (Rationing) (Amendment No. 6) Order, 1953, the Fats and Cheese (Rationing) (Amendment) Order, 1954, and the Fats and Cheese (Rationing) (Amendment No. 2) Order, 1954.
606	,, 16.	Order amending the Food Rationing (General Provisions) Order, 1953.
607	,, 16.	The Bacon (Rationing) Order, 1954. Revokes S.I. 1953, Nos. 793 and 1256.
608	,, 16.	The Meat (Rationing) Order, 1954. Revokes S.I. 1953, Nos. 795 and 1729, and S.I. 1954, No. 170.
797	June 21.	Order revoking the Food Rationing (General Provisions) Order, 1953, the Food Rationing (General Provisions) (Amendment) Order, 1953, the Food Rationing (General Provisions) (Amendment) Order, 1954, the Food Rationing (General Provisions) (Amendment No. 2) Order, 1954, the Meat (Rationing) Order, 1954, and the Bacon (Rationing) Order, 1954.
819	July 4.	Order revoking the Food (Seasonal Allowances) Order, 1948.
826	June 27.	Order revoking the Pigs (Sales) Order, 1948, and the Pigs (Sales) (Amendment) Order, 1948.
827	,, 27.	Order revoking the Pigs (Sales) (Northern Ireland) Order, 1940.
		WELFARE FOODS
612	May 16.	Order amending the Welfare Foods Order, 1953.
		SHIPS' STORES
494	Apr. 18.	Order amending the Ships' Stores (Charges) Order, 1952.
564	May 9.	Order amending the Ships' Stores Order, 1953.

Real Farmhouse Cheshire Cheese

Three years ago, the milk lorry called daily at Abbey Farm, near Prees in Shropshire, to collect the day's output. Today, the milk yield from Mr. Lance Appleby's 300 acre dairy farm is greatly increased, but no milk leaves the dairy; instead it is converted into Cheshire cheese.

IT is estimated that 70 or more farmers are now engaged in the making of Cheshire Cheese. Among them is Mr. Lance Appleby, who farms in the Prees district of Shropshire adjoining the southern end of the Cheshire Plain. Until three years ago, Mr. Appleby was a milk producer, but he decided to turn the whole of his milk production into cheese, and to utilise the by-products for feeding pigs.

Miss Joan Furber, ex-student of Radbrooke, with the help of an assistant, is the cheesemaker. Mrs. Appleby, a member of the well-known cheesemaking and farming family, the Walleys, supervises the modern, white-tiled dairy.

The herd of 110 Attested Friesians is milked morning and evening by four men, the milk being conveyed through filters into a long 400 gallon steam jacketed vat, the temperature of which is controlled by means of an overhead valve.

The curd is weighed prior to milling.

Some of the previous day's milk which has been sterilised is inoculated with a starter, containing certain lactic acid bacteria; this is added to the milk and the whole is stirred, the temperature being raised to about 87°F. or more according to the time of the year.

When the correct acidity is reached, rennet, previously diluted with water, is added to the vat and thoroughly stirred in, producing coagulation and, later, the curd which is cut lengthwise and across. The temperature is raised still further very slowly and, at the same time, the contents of the vat are kept moving with a rake for about three-quarters of an hour. Further acidity tests indicate the rate of processing until such time as the curd settles at the bottom of the vat, leaving the whey on top. When the whey is ready for draining, some of the curd is moved from the end of the vat before drawing it off through a filter. The remainder of the fat is taken from the whey by means of a separator, the whey being pumped to the piggeries and the remaining cream pasteurised and churned for buttermaking, 36 gallons of whey yielding 1 lb. of butter. Mr. Appleby estimates that the production of this butter adds another penny per gallon to his returns.

Meanwhile, the curd is slowly drained in the bottom of the vat and cut into small blocks, leaving a narrow channel in the middle. The blocks are frequently turned and broken, the draining con-

After filling into moulds, the cheese is turned into fine cloths and pressed.

The cheese is stored at even temperature for two or three weeks.

tinues, and the acidity slowly develops. When the correct acidity is reached, the curd is weighed and milled. Salt is added during this latter operation and the curd is then filled into 13 in. moulds, averaging 60 lb. each.

The next day, the cheese is turned into fine cloths and put into the presses. After 24 hours, the cheese is again turned, put into fresh cloths, and returned to the presses for increased pressure. On the last day of pressing, usually after 48 hours, the cheese is quite dry. Calico is pasted on the ends and then wound round the whole cheese, after which it is kept at an even temperature for two or three weeks. After grading, the cheese is ready for despatch, bearing the insignia C.C.C., which stands for Choice Cheshire Cheese.

Food Poisoning

DURING the 20 years that have elapsed since the publication of the first edition of a valuable work on food-borne infections and intoxications, a considerable amount of experimental research has been carried out in America, Great Britain, and on the Continent dealing with the causation and prevention of food poisoning outbreaks; consequently the second edition of the book* has been much enlarged so as to include the new material.

There are 16 chapters giving a clear and comprehensive account of all food-borne infections and intoxications. These include: food hygiene, food-borne bacterial and virus diseases, poisonous plants, fungi, animal products, and a final chapter on metals in food and their possible relation to illness. In addition, the authors have discussed such diseases as typhoid fever, the dysenteries, brucellosis, and tuberculosis and their causation through the consumption of infected food and beverages; also the relation of putrefaction of food to illness; ptomaines and ptomaine poisoning.

The main causes of food poisoning, viz. salmonellosis, staphylococcus, and botulism, have been adequately dealt with; however, although staphylococcus food poisoning is apparently more or less common in America, it has been assigned only 47 pages, whereas salmonellosis, which is not prevalent, has 135 pages devoted to it. This may be attributed in a measure to the fact that salmonellosis is of frequent occurrence in Great Britain and other European countries.

In compiling the work, the authors have culled and studied a vast amount of information, especially on bacterial food poisoning, and have given a comprehensive review of the literature and researches made in countries outside America without discrimination, leaving the reader to form his own interpretations and conclusions.

As mentioned by the authors in the preface: "An attempt has been made in this book to present the information on food-borne infections and intoxications as given in the literature." A vast amount of research work has been entailed in compiling the information given in this volume, as it is widely disseminated in medical books, scientific journals and pamphlets, and Public Health reports.

In a future edition it is recommended that the following receive attention: Chapter XI, only 23 pages have been allotted to the subject of tuberculosis in foods, and although the problem of the eradication of the disease in dairy cattle in America is reviewed and discussed, very little information has been given about its prevalence among the cows in Great Britain (where the tubercle infected rate is about 40 per cent.) or the measures being taken to reduce the incidence of this disease. This chapter should be expanded to include a comprehensive account of the whole subject.

In Chapter XIV, under "Miscellaneous organisms—anaerobic bacteria," only a limited reference has been made to *Cl. welchii* as a cause of food poisoning. No mention is made of the recent important investigations carried out by Oakley and Warrack and by Hobbs, Smith, Oakley, Warrack, and Cruickshank, showing that *Cl. welchii* should be included in future among the causative organisms of food poisoning outbreaks.

The second edition of this work is well arranged and produced and contains a vast amount of information. It will be a valuable addition to all scientific libraries as a book of reference for research workers and invaluable for consultation by Medical Officers of Health, students, and others interested in food poisoning outbreaks.—E. C. D.

* *Food-borne Infections and Intoxications*. By Fred W. Tanner, Ph.D., B.Sc., and Louise P. Tanner, Ph.D. Second edition. Pp. 769+x. Garrard Press. Price $12.

The Slaughterhouses Act, 1954

THE provisions of sections 57, 60, and 61 of the Food and Drugs Act, 1938, dealing with the licensing of private slaughterhouses, the provision of public slaughterhouses, the making of charges, the closure of private slaughterhouses, and the payment of compensation, are amended by the new Slaughterhouses Act which received Royal Assent on July 5.

Section 1 of the new Act lays on local authorities the duty of ensuring that there are adequate slaughtering facilities available to meet the needs of traders.

It also states that a local authority which has provided a public slaughterhouse may make appropriate arrangements to operate a slaughterhouse by its own employees and to exclude other persons. This is to enable local authorities to adopt the line system in place of the booth system where the slaughterhouse is suitably constructed or adapted. It is expressly stated, however, that these powers must not be exercised in such a way as to deprive any religious community of reasonable means of obtaining meat from animals slaughtered in accordance with the rites of their religion.

Section 2 empowers a local authority which has provided a public slaughterhouse to make such charges for its use as it thinks fit. The scale of charges must be published in at least one local newspaper and a copy must be sent to the Minister of Food. If the Minister considers that any charges are unreasonable, he may direct the local authority to modify them, and the authority must comply with the direction for such time as the Minister may specify. The Minister will be prepared to examine any scale of charges if he is satisfied that representations made to him by persons appearing to him to have a substantial interest in the matter are reasonable and that the charges ought to be investigated.

Section 3 enables a local authority to grant licences expiring at any time before July 31, 1959, instead of for a period of 13 months only as provided by the Food and Drugs Act. This concession lasts only until June 30, 1956, and does not apply to a slaughterhouse used primarily for the slaughter of horses. The section also prohibits the granting of licences for new premises without the consent of the Minister. New premises are defined as those which have not been lawfully used as a slaughterhouse at any time since October 1, 1934.

The section makes it clear that a licence may be refused if the hygienic requirements of the Food and Drugs Act or of regulations made under that Act are not complied with. The right of appeal is preserved.

Under the Food and Drugs Act, certain classes of slaughterhouse were assured of a perpetual renewal of their licences so long as the premises were not allowed to become irremediably defective and the occupier was a suitable person. Section 3(4) removes these licensing privileges and places all slaughterhouses on the same footing. In order to provide a smooth transition to these new conditions, occupiers of these slaughterhouses are assured of a renewal of their licences if they apply before the end of this year and the premises are in such a condition that they can readily be made hygienic.

Section 4 read with section 61 of the Food and Drugs Act, which it amends, empowers a local authority, which is satisfied that there are sufficient public slaughtering facilities (whether in its own or another district) available to traders, to pass a resolution to close some or all of the slaughterhouses in its district and to grant no further licences. Where there are enough private slaughterhouses in its district, a local authority may also pass a resolution to grant no further licences, but not to close existing slaughterhouses. In both cases, the resolution must be published in one or more local newspapers and a copy sent to the Minister, who, before approving the resolution, is required to take into consideration any representations received by him within two months. A resolution does not take effect until approved by the Minister.

A resolution to close private slaughterhouses may contain exemptions for particular slaughterhouses and the Minister may require that further exemptions be made. If any slaughterhouse is exempted the local authority may not thereafter refuse a licence for that slaughterhouse unless the premises are unhygienic or the Minister's consent has been obtained. If a licence is refused on hygienic grounds there is a right of appeal to the Courts, but there is no appeal if the licence is refused with the Minister's consent.

Payment of Compensation

Section 5 deals with compensation which is payable in the following cases:

1. Where as the result of a resolution passed after July 1, 1954, a slaughterhouse is closed.

2. Where as a result of a resolution passed after July 5, 1954, and before July 1, 1955, a licence is refused and:

(*a*) the premises were licensed and in use on October 1, 1939, but are not licensed on the date of the resolution, and

(*b*) the application is made either before the date when the resolution is passed or within seven days after that date.

3. Where as a result of a resolution passed after January 1, 1954, and before July 6, 1954, an application for a licence for premises which were licensed and in use on October 1, 1939, but were not licensed at the time of the resolution is refused, and an application for compensation is made not later than July 19, 1954, or within a fortnight of the date on which the resolution takes effect, whichever is the later.

Compensation is payable to any person having an interest in the land or premises the value of which is reduced in consequence of the action of the local authority. Account is to be taken of the value of any fixed plant or machinery which are on the premises at the relevant time, but not of goodwill or of any other matter not directly based on the value of the premises or land. Compensation is to be assessed by considering the amount which the interest in question would have realised on a sale in the open market by a willing seller.

The foregoing provisions refer to England and Wales and the appropriate ones for Scotland are in Part II of the Act. Any disputes arising in respect of compensation are to be determined by the Lands Tribunal.

Chemists Visit Merseyside

For their 73rd annual meeting, the Society of Chemical Industry went to Liverpool, a particularly fitting background for a gathering of industrial chemists, not only because of the size and variety of chemical industry on Merseyside but also because this area can claim to have inspired the original idea of forming the Society, the Liverpool section being formed in the same year (1881) that saw the birth of the Society.

THE 73rd annual meeting of the Society of Chemical Industry, which took place from July 12 to 17, was the seventh to be held in Liverpool. In the 18 years that have elapsed since the last Liverpool meeting in 1936, many new industries have been established on Merseyside. These include the Stanlow refinery of the Shell Co., Fibreglass Ltd. of St. Helens, the carbon black factory of Cabot Carbon Ltd. at Ellesmere Port, the antibiotics factory of Distillers Co. (Biochemicals) Ltd. at Speke, and Albright and Wilson's factory at Kirkby for the manufacture of sodium tripolyphosphates for detergents. All these factories were visited by members during the meeting. A visit was also made to the new plant of Associated Ethyl Co., Ltd., at Amlwch, Anglesey, where bromine is extracted from sea water and converted to ethylene dibromide for the manufacture of T.E.L. anti-knock compounds.

In addition, visits were made to Evans Medical Supplies Ltd., and to Goodlass Wall and Co., both at Speke, to the vast Lever Bros. factory at Port Sunlight, to Prices (Bromborough) Ltd. which recently celebrated their centenary, to I.C.I. General Chemicals Division, Widnes, to the Ruabon (North Wales) works of Monsanto Chemicals Ltd., to Brotherton and Co., Ltd., Bromborough, Dunlop Rubber Co., Ltd., Speke, Peter Spence and Sons Ltd., Widnes, J. Crosfield and Sons, Ltd., Warrington, J. Bibby and Sons, Ltd., Bowaters Paper Mills, Ltd., Lobitos Oilfields, Ltd., Meccano Ltd., Brown, Bibby and Gregory, Ltd., Birkenhead Brewery Co., Ltd., and John Summers and Son, Ltd. All these visits provided something new in the way of processes and plants, illustrating the great diversity of chemical activities on Merseyside.

President's Address

The meeting opened on Monday evening, July 12, with a reception at the Adelphi Hotel by the general managers of "Shell" Refining and Marketing Co., Ltd. and Shell Chemicals Ltd.

On Tuesday the annual general meeting was held in the University and members were welcomed by the Lord Mayor of Liverpool and the Vice-Chancellor of the University.

Lord Cherwell receives the Messel Medal from Sir William Ogg.

The President of the Society, Sir William Ogg (Director of Rothamsted Experimental Station), then gave his address in which he reviewed recent activities of the Society. The membership, he said, was smaller than it should be and, indeed, during 1953 it had fallen by 238, so that the total was now 7,489. He appealed to his audience to do what they could to attract new members.

A brighter aspect of the past year was the acquisition of Nos. 14-16, Belgrave Square, London, for the headquarters of the Society. For this solution of the Society's grave accommodation problem, Sir William praised the work of Dr. John Rogers and his committee. The Society had security of tenure of the new premises for 80 years and the buildings should be ready for occupation within a year.

At the luncheon given by the Liverpool Section which followed the annual general meeting, the chairman of the Section, Dr. L. J. Burrage (I.C.I.), spoke of the intimate connexions between the Society and Liverpool. Recalling the last Liverpool annual meeting, he said that the then President, Mr. W. A. S. Calder, had spoken of the urgency of reducing accidents in chemical works. At this meeting the theme of "Safety" had been continued with an exhibition, "Safety in Chemical Laboratories," at the University, and the adoption of the safety colour "green" for the colour of the handbooks and the badges.

In his reply, Sir William Ogg said how pleasing it was for the Society to return to Liverpool, "the cradle of heavy chemicals," for its annual meeting.

The final event of the day was a civic reception in the Town Hall. Among those present was the Deputy Lord Mayor, Alderman W. J. Tristram, a former President of the Pharmaceutical Society.

Messel Medal Address

The outstanding event of Wednesday was the presentation of the Messel Gold Medal of the Society to Lord Cherwell, F.R.S., a member of the new Atomic Energy Authority and the Prime Minister's personal adviser on atomic energy. The need for more technologists, and the future of atomic energy

were the main themes of Lord Cherwell's address. He vigorously criticised the "ridiculous intellectual snobbery" which in his view had stifled the development of technology in Britain. Discussing technologists *vis-à-vis* Arts graduates, he said that he thought it was more important to know the properties of chlorine than the improprieties of Claudius! It took more brains to become a first-class technologist than to become a lawyer. Unfortunately, the men who ruled us were not technologically minded and it was regrettable that the United Kingdom, in singular exception to almost every other civilised country, did not have a great technological university.

After discussing his early research on chemical reaction velocities and other fundamental studies, Lord Cherwell turned to a review of the new epoch of nuclear chemistry. In contrast to the chemical changes he had been discussing, the energies involved in nuclear chemistry were a million times greater. We knew only some of the rules, not the complete system. The structure of the atom and nucleus was still to be studied. The great problem of the future was whether this enormous power was to be harnessed by building up or by breaking down nuclei. The latter was dependent upon a relatively scarce commodity (uranium), while the former was based upon much more common substances so that it had greater practical possibilities.

Finally, Lord Cherwell turned to the role of atomic energy in the future of mankind and concluded: "Whether *homo sapiens* will accept the vast benefits which science offers him or whether he will use the colossal powers scientists have put at his disposal to restore the surface of this puny planet to the primeval slime from which it has emerged in the last one thousand million years, the future, and perhaps the very near future, will show."

Annual Dinner

The chief guest at the annual dinner was Dr. Alexander Fleck, chairman of Imperial Chemical Industries Ltd. He forecast that the "cold war" would continue for the lifetime of most people present, and went on: "I do not believe that the continuation of such conditions need necessarily frighten us; they are certainly preferable to total war. I believe that we will move out of the conditions of the cold war only by the gradual extension of local agreements on specific issues rather than by any dramatic settlement. This means that in the long run the peacemakers may well be the traders and the manufacturers rather than the politicians. However much people may dislike each other's ideas or each other's way of life, there comes a point at which they have to trade with each other."

Dr. Alexander Fleck (*centre*) **talks to Sir James Mountford, Vice-Chancellor of Liverpool University, at the annual dinner. Sir William Ogg is on the right.**

Dr. Fleck deplored the lack of technologists in the chemical industry and urged young men to realise that applied research was just as important as pure research.

Another prerequisite for a vigorous chemical industry was an adequate flow of capital. Today an investment of £10,000 at least was needed for every worker in the industry. To provide money on this tremendous scale the chemical industry had to earn sufficient profits to attract investors. Unfortunately, present taxation policy hindered this.

Other speakers were Sir William Ogg, Prof. T. P. Hilditch, F.R.S., the Vice-Chancellor of Liverpool University, Sir James Mountford, Mr. J. A. Oriel, C.B.E., and Lord Cherwell.

The concluding social events of the meeting were a lunch given by I.C.I. on Thursday at the Bluecoat Chambers, Liverpool, presided over by Dr. Alexander Fleck, a reception by the University of Liverpool on Thursday evening, and a reception and dance on Friday evening at Hulme Hall, Port Sunlight, by invitation of the directors of Lever Bros., Port Sunlight, Ltd., when guests were received by the chairman of the company, Mr. G. A. S. Nairn.

A number of lectures were given during the meeting. They were: "Polythene 21 Years After its Discovery," by E. Hunter; "Sulphur and Sulphuric Acid from Petroleum," by F. E. Hixon; "Glass Fibres, their Manufacture, Properties, and Uses," by A. De Dani; "Some Contributions of Chemistry in the Winning of Metals," by E. L. Day; "Conventional and Unconventional Features in the Composition of Some Natural Fats," by Prof. T. P. Hilditch, F.R.S.; "Recent Chemistry of Phosphine," by N. L. Paddock; "Developments in Soap-making," by E. H. Palmason; and "Aspects of the Mode of Action of Vitamin A," by Prof. R. A. Morton, F.R.S.

TO AUTHORS AND READERS

The publishers of FOOD MANUFACTURE invite the submission of manuscripts of books to be considered for publication. All manuscripts will be promptly acknowledged and carefully considered by qualified experts. A synopsis with chapter headings should be sent in the first instance, addressed to the Book Production Manager.

The publishers are specialists in industrial and scientific books and have a world-wide selling and distributing organisation.

Human and Animal Nutrition

It was not easy to foresee how the second volume of a recent work* could supplement the basic information contained in Volume I, devoted to a consideration of the essential framework of the biochemistry and physiology of nutrition, without either extending the field of enquiry too widely or duplicating much of what had already been written. Such duplication seemed the more probable because two entirely different groups of authors have been responsible for the two volumes.

Although there is undoubtedly some overlap between the chapter on "Structural Changes in Vitamin Deficiency" and certain chapters in Volume I, the former is concerned solely with the pharmacological and clinical consequences of vitamin deficiency and discusses other aspects of the subject only incidentally. The great merit of this particular chapter is that it is not merely descriptive, but examines critically much of the earlier work and does not hesitate to throw suspicion on claims thought unjustifiable by the author.

To those primarily interested in human nutrition, one of the most useful sections of the book will be the three chapters on enzymes and coenzymes. Here are collected together a selection of the most significant results obtained in this field in recent years. Each of the enzymes that plays a part in the process of digestion, as well as those responsible for biochemical reactions within the body tissues, is discussed in turn, the section on proteolytic enzymes being particularly illuminating for the non-specialist, whether nutritionist or biochemist, who may not be familiar with the latest developments.

The two chapters on respiratory enzymes and coenzymes cover a field that is perhaps better known, but a great deal of up-to-date information has been collected together which will be found most helpful. There are excellent summaries, for instance, of recent work on coenzyme A, which is now known to effect a variety of transformations involving acyl groups, and on the amide of thiamine and lipoic acid, recently shown to be the coenzyme responsible for the oxidation of pyruvic acid.

A fascinating chapter for those interested in the contribution made by different biochemical reactions to the energetics of the body deals at length with such matters as high energy phosphate esters and their relation to the Krebs' cycle, and with the role of mitochondria in oxidative phosphorylation.

Another valuable chapter covering a subject not often reviewed is one on the microbiology of digestion. Although naturally concerned mainly with the ruminants and other animals, the nature of the intestinal flora and its products is not without importance in humans; reference is made, for example, to recent observations on the effect of breast feeding on the faecal flora of infants and to the effect of antibiotic feeding on the dietary requirements of certain vitamins.

An unexpected chapter in a book on nutrition, but one that will certainly appeal to research workers engaged in parasitology or chemotherapy, is one relating to the nutrition of invertebrate animals. It summarises what is known about the growth factors required by different organisms and describes the many attempts made to inhibit growth by means of antimetabolites.

The last section of the book is devoted to a consideration of the metabolism of iron, calcium, and phosphorus and of the part played by trace elements in the nutrition of man and animals, while the final chapter on the "Application to Human Nutrition" virtually summarises the chief conclusions of both volumes and emphasises their practical importance to nutritionists.

Volumes I and II together cover a vast field of knowledge, wider perhaps than might have been anticipated from the title, for several of the chapters deal at length with animal as well as with human nutrition. Each chapter is well documented and there are excellent plates illustrating the two chapters on the "Intracellular Localisation of Enzymes and Vitamins" and "Structural Changes in Vitamin Deficiency." The printing and binding are of high quality but there are a number of misprints which should be corrected in future editions.—F. A. R.

* *Biochemistry and Physiology of Nutrition.* Volume II. Edited by G. H. Bourne and G. W. Kidder. Pp. 641 + xi. Academic Press. Price $15.00.

Vegetable Research

Among the investigations carried out by the British Society for the Promotion of Vegetable Research and described in the fourth annual report for the period October, 1952, to September, 1953, was that concerned with vegetable washing.

During the year under review, work of this nature was concerned with carrots (bunched and main crop), celery, leeks, parsnips, radishes, and spring onions. Batches of vegetables were washed by one or more methods and unwashed batches were taken as controls. Subsequent transport and handling were alike for the washed and unwashed batches and simulated the normal procedure in the marketing of the vegetables. Corresponding samples of washed and unwashed material were then kept at two or more constant temperatures.

Detailed observations were recorded on change of quality, *e.g.* wilting, change of colour, post-harvest growth, progress of rotting, etc., on comparable samples from the different treatments.

The complete analysis of these observations, when published, will throw considerable light on the advantages and disadvantages of washing vegetables as regards their rate of deterioration.

The results to date have indicated that with washed celery, wilting was delayed, pithiness developed less rapidly, and there was more leaf growth than with unwashed celery. Washing had little or no effect on colour, discoloration, stringiness, rotting, broken and split leaves, and box damage.

Abstracts From Recent Food Literature

Organisation and Cleanliness are the Outstanding Features of Paris Confectionery Manufacture. (*Revue Technique de l'Industrie Alimentaire*, 1954, **2**, May, 15).—Description of the machinery and equipment of a leading factory of sugar confectionery (*Etablissements Paris—Gourmand*), founded in 1875. The machinery includes the latest French, British, German, and Italian devices for production, packaging, etc.

Corrosion of Aluminium Dairy Equipment. G. H. Botham and W. R. Bryson (*J. Dairy Res.*, 1953, **20**, 154).—These workers have come to the conclusion that small amounts of copper contained in the water are responsible for the pitting of the surface of aluminium dairy equipment. In order to remove the copper, the use of an ion-exchange column is recommended. Zeocarb 215 is the agent suggested for this purpose.

Food Poisoning through Artificially Green-coloured Canned Spinach. E. Goldstein (*Fette, Seifen, Anstrichmittel*, 1954, **56**, 109).—The Director of the Municipal Testing Institute at Bielefeld, Germany, discusses a case of food poisoning affecting 75 girls in an industrial hostel, traced to an excessive admixture of copper sulphate to canned spinach. Although, since 1928, the permissible copper admixture to vegetables has been 0·1 g. per kg., the event under discussion has again shown the risk of food poisoning owing to an accidental addition of a quantity in excess of the legal one. The admixture of copper sulphate as a colouring matter for vegetables should therefore be totally prohibited, especially as it is also detrimental to the vitamin C contents.

Processing of Slaughterhouse Offals, Bones, and Blood. F. P. Niinivaara (*Die Fleischwirtschaft*, 1954, **6**, 181).—Efficient utilisation of offals is regarded as a matter of great economic importance, especially in a country where nearly all animal protein fodder has to be imported. The author, who is in charge of the research laboratory of the co-operative slaughterhouse in Finland, describes a prototype plant for the processing of offals, bones, and blood, which has been installed at the abattoir of Kuopio, Finland. In contrast to others of this kind, dried bone and fat prepared in this plant do not develop undesirable odours, and practically all the solid substances contained in the original raw material are recovered.

The Continuous Feed Regulation of Liquids and Powders in Biscuit Manufacture. (*Revue Technique de l'Industrie Alimentaire*, 1954, **2**, April, 29).—A survey of modern machinery permitting the continuous feed regulation of liquids (milk, water, syrup, liquid fats), powders (sugar, flour, broken biscuit powder) and certain solids (mainly fats) for the purpose of converting the intermittent process of biscuit manufacture into a continuous process. Special reference is made to feed regulation pumps arranged in batteries for the controlled feed of several different ingredients and, in the field of powder feeds, continuously acting weighers, electronically controlled and having an error margin of no more than 1 per cent.

Corrosion and Tablet Machinery. K. A. Mitchell (*Corrosion Tech.*, 1954, **1**, 161).—The author describes how tablet making machinery manufacturers guard against corrosion and gives some hints on the care of machines to give a corrosion-free life.

Protective Wrapping of Frozen Skinned Rabbits. J. R. Vickery (*Food Pres. Quart.*, 1953, **13**, 79).—Skinned rabbits are more susceptible during storage than almost any other form of carcass meat to severe freezer burn, which often causes depreciation in value. The author describes two preventative techniques involving protective wrapping which markedly reduces the rate of loss of moisture from the frozen carcasses.

Recommendations Assure Results when Adding Ascorbic Acid during Sausage Curing. (*Food Processing*, 1953, **14**, 20).—Ascorbic acid applied in proper amounts in solution form to meats used in the formulation of sausages and similar meat products is reported to achieve an efficiency that improves the curing process. It effects a more even cure to improve quality, reduces shrinkage, and cuts curing time in half to speed production.

Antibiotics in Food Processing. J. C. Lewis, H. D. Michener, C. R. Stumbo, and D. S. Titus (*J. of Agric. and Food Chem.*, 1954, **2**, 298).—Three views of the possible role of antibiotics in food preservation are compared: prevention or retardation of the outgrowth of viable spoilage organisms, killing of vegetative cells, including germinating spores, and synergising effect on the thermal death of spores of heat-resistant spoilage bacteria. Whether subtilin may act through distinct mechanisms in exhibiting various types of activity is considered. The behaviour of other antibiotics and the implications for screening of antibiotics to be used with heat processing in food preservation are discussed.

Canning Bananas. P. W. Board and P. E. Seale (*Food Pres. Quart.*, 1943, **14**, 2).—Canned bananas are now an established commercial pack with a ready market. These notes concern canning procedure and the avoidance of discoloration.

Connective Tissue of Meat. IV. L. H. Lampitt, L. C. Baker, and K. P. Brown (*J. Sci. Food Agric.*, 1954, **5**, 343).—Collagen was determined in samples of fresh, frozen, and freeze-dried silverside by determining hydroxyproline in the acid hydrolysate of (i) the meat, (ii) the direct aqueous autoclave extract of the meat, and (iii) the aqueous autoclave extract of the residue left after preliminary extraction of the muscle tissue with dilute alkali or acid; collagen was also determined in (iii) as the loss of weight when the residue was autoclaved with water.

Causes of Blown Cans. J. Viennot (*La Revue de la Conserve de France et de l'Union Française*, 1954, **9**, June, 82).—The author discusses in some detail the steps to be adopted to avoid blown cans and outlines the precautions to be taken during sterilisation, and especially the control apparatus required, the cooling methods, the precautions to be taken in storing

the cans after sterilisation, and the methods of purifying the cooling water.

The Manufacture of Butter for Cold Storage. T. Olsson (*Svenska Mejeritidn.*, 1953, **45**, 307).—Special care is needed in the manufacture of ripened cream butter for cold storage and the author discusses the various stages at which conditions necessary for the control of bacterial and chemical faults may be established.

Studies on the Manufacture of Corn Syrups Specially Suited for the Production of Hard Caramels. E. Lindemann (*Gordian*, 1954, **54**, No. 1286, 13).—As hard caramels consist largely of starch syrup, the quality of the latter is of particular importance. The author has carried out research on the syrup properties best suited for hard caramel production. The syrup must have the proper flavour and appearance, it must not become brown when cooked with cane sugar, and it must have a low degree of hygroscopicity. Flavour and appearance depend on the purity of the starch, the reagents, and substances used for neutralisation, decolorising, etc., and also on the containers used. The brown colouring is due mainly to the Maillard reaction and is promoted by certain metal salts. The hygroscopicity depends mainly on the quantity of invert sugar and the glucose content of the syrup.

Meal from Groundnut Cake after Oil Extraction. To what Extent can it be used for Animal and Human Consumption? E. Aubertin, A. Dangoumau, and R. Castagnou (*Oléagineux*, 1954, **9**, 507).—Continuing a research programme already reported upon during the war, scientists working at research laboratories at Bordeaux have endeavoured to find out whether meal from groundnut cake after oil extraction can be toxic, whether it can be wholly assimilated, and to what extent it can be used as a food for man and beast. Systematic and controlled feeding experiments were carried out on dogs and pigs. Certain experiments were also carried out with carefully controlled admixtures to the diet of human volunteers. It was found that the peanut meal, if properly prepared and preserved, was not toxic, and that human beings not suffering from digestive or hepatic diseases could absorb without harm a daily dose of up to 40 g. Any greater quantity leads to a dangerous accumulation of nitrates.

Utilisation of Ultra-violet and Infra-red Rays in the Fruit Industry. E. Navellier (*Fruits*, 1954, **9**, 212).—The second part of a survey, dealing with modern radiation methods as applied in the fruit and related industries, is concerned with infra-red radiation and its application to fruit dehydration (prunes, apricots, vanilla beans, banana powder); drying of vegetable products (flour, grain, fodder lucernes, tobacco, etc.); roasting of cocoa nibs and coffee beans; baking and cooking of certain food products, *e.g.* pre-heating of fruit juices before bottling; sterilisation of containers, etc.; drying of labels on cans and bottles. Infra-red radiations may also be used in the fruit industry as a protection against frost and insecticide action, and for the control of laboratory climates.

Bread and Health

THREE men, each eminent in his own sphere, have collaborated to produce a book on bread.* Anyone interested in the subject must have awaited the opportunity of reading this work with keen anticipation, but the reviewer has just laid the book aside with a slight sense of disappointment. This may be because the volume is addressed, according to the authors' preface, to "that section of the public which possesses a scientific background—a section which includes the doctor, the science teacher, the social worker, and the dietitian."

Doubtless many of these people will find much that is new to them and much that is of interest in the work, but anyone who has studied the subject will also find much that has been at least as thoroughly dealt with in the established textbooks of the milling and baking industries. To a baker, the proportion of space allocated to wheat and milling may seem unduly large in a volume on bread, but this is understandable since the authors are more closely associated with the scientific and medical aspects of flour manufacture than with bread production.

The most important and authoritative chapters in the book are undoubtedly those dealing with the nutritive value of bread, the nutritional problems connected with flour treatment, and the use of additives. These chapters serve a useful purpose in assembling in one place references to the more important investigations which have taken place in this field during recent years; even here the delay in publication of the McCance and Widdowson report causes reservations to be made.

The authors pay tribute to the "scientific insight and prescience" of the Munro Committee whose report was published in 1927. They point out how recent work appears to support what was then conjecture concerning the probable effects of nitrogen trichloride on flour. In this connexion they add that it would take 160 years to build up in man the dose of methionine sulphoxime which is toxic to monkeys.

There is, however, little discussion of the practical and pharmacological steps to be taken in deciding which additions to food are harmful and the proportions in which such additions may be regarded as toxic. This is one of the basic difficulties of dealing legally with any "permitted list" of food additives.

The book is a fair and factual survey of the present state of knowledge of bread and its part in the diet and the authors have succeeded in producing a valuable book for those to whom they have primarily addressed themselves. If they also succeed in influencing the trend of public discussions of bread as a staple food and raising these discussions to a more objective level, then they are indeed to be congratulated.—S. W. B.

**Bread.* By Lord Horder, G.C.V.O., M.D., F.R.C.P., Sir Charles Dodds, M.V.O., M.D., D.Sc., Hon.Sc.D.(Camb.), F.R.S., and T. Moran, C.B.E., D.Sc., Ph.D. Pp. 185. Constable. Price 18s.

News from the Industry

FORTHCOMING EVENTS

Mr. W. Leonard Hill's Liverpool Address

Mr. W. Leonard Hill, Chairman of Leonard Hill Limited, publishers of FOOD MANUFACTURE, has accepted an invitation from the City of Liverpool Public Libraries Committee to deliver his address "Making Known" at the Central Public Libraries, Liverpool, on Wednesday, October 13, at 7.30 p.m. Mr. Hill originally gave the address in his capacity as Chairman of the Agriculture Group of the Society of Chemical Industry at the Annual General Meeting, Burlington House, London, on May 18. The lecture at Liverpool, the first of a number of Technical Information Lectures to be given during the 1954-55 session, is being arranged in collaboration with the Association of Special Libraries and Information Bureaux (ASLIB).

Mr. W. Leonard Hill.

Other lectures in this series will deal with the subjects of welding (November 10), British Standards in Production Engineering (December 8), packaging (January 12), detergents (February 9), and high voltage engineering (March 9).

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European Management Conference

Organised by the British Institute of Management at the special request of the European Council of the International Committee for Scientific Management, the first European Conference devoted entirely to management problems will be held at Torquay from October 20 to 28.

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Measurement of Particle Size

A course of lectures, demonstrations, and practical instruction on "The Measurement of the Particle Size Characteristics of Fine Powders" will be given at the University of London King's College, Faculty of Engineering, in the week commencing September 27, daily between 10 a.m. and 5 p.m. by Dr. H. E. Rose, D.Sc.(Eng.), Ph.D., M.I.Mech.E., A.M.I.C.E.

The lectures will broadly cover the principles and theory of the simpler methods of analysis, the relevant calculations, and a discussion of the limitations and field of application of the various methods. Demonstrations and practical work in fields such as the following will be carried out: sedimentation tests, microscopic analysis, surface adsorption methods, tinting strength, diffraction methods, permeability tests, and bulk density measurement.

■

Borough Polytechnic Courses

A number of special evening courses to begin in October are announced from the Department of Chemistry and Food Technology at the Borough Polytechnic. These include:

1. *Microbiology.* Introductory and advanced courses (lectures and laboratory work) by Mr. L. D. Galloway, M.A., and Miss J. O'Riordan, M.Sc.
2. *Microbiological Methods of Vitamin Assay.* Lectures and laboratory work, by Dr. E. Barton-Wright, D.Sc., F.R.I.C.
3. *Nutrition. Introductory.* Lectures and demonstrations by Mr. D. Papworth, M.Sc.
4. *Nutrition. Advanced.* Lectures by Dr. H. E. Magee (Ministry of Health) and panel of specialists.
5. *Rodent Control.* Mr. D. Papworth, M.Sc. (Veterinary Research Laboratory), and Mr. A. Taylor, A.R.I.C. (Pest Infestation Laboratory).
6. *Surface-active Agents.* Panel of lecturers.

Syllabuses and other details of these special courses may be obtained on application to the Department of Chemistry and Food Technology, Borough Polytechnic, London, S.E.1.

Brine Making

A constant supply of fresh, clean, saturated brine without the use of agitators or other moving parts is provided by equipment now being made in this country by A. Johnson and Co.

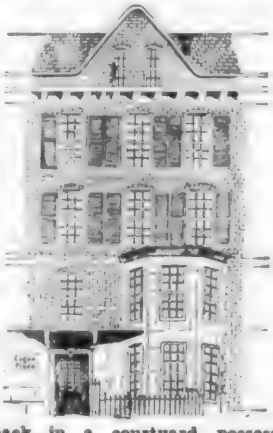
The tank and hopper of the brine maker are filled with coarse grained salt of suitable type, water entering near the top from a small supply tank fitted to the side of the main tank. A constant water level is maintained in the supply tank by means of a float-valve. Moving downwards, the water dissolves increasing quantities of salt until it becomes saturated, the rate of flow being determined so that the saturation point is reached about a foot above the bottom of the main tank. Below this point, the salt is not dissolved but acts as a filter bed, thus assuring that the discharged brine is entirely free from dirt and other insoluble matter.

When the salt in the filter bed becomes clogged up with insolubles, it can easily be flushed away through the bottom outlet by means of special flushing nozzles which are built into the equipment.

If the demand for brine is concentrated to part of the day, for example, in a factory working dayshift only, the brine maker can be combined with a storage tank, thus permitting continuous working.

Food Manufacturers Federation New HQ

Many distinguished guests were present at the official opening of the new headquarters of the Food Manufacturers Federation at 4, Lygon Place, London, S.W.1.



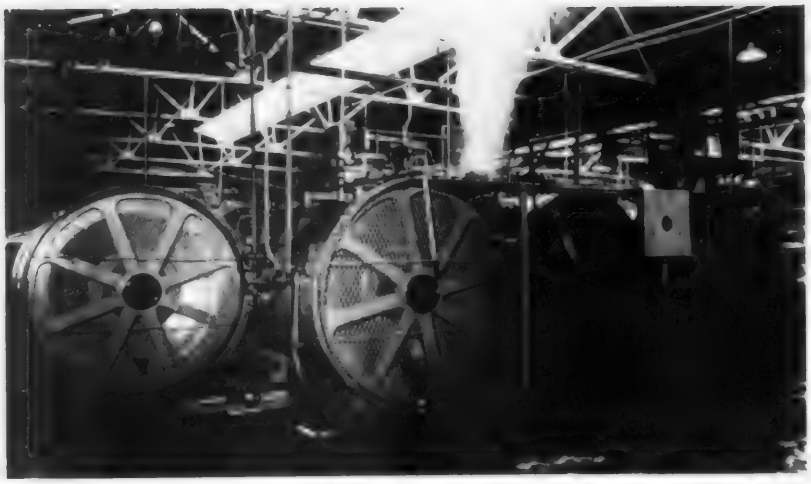
Set back in a courtyard possessing a quiet dignity are the new headquarters of the Food Manufacturers Federation.

The guests, among whom were Major the Rt. Hon. Gwilym Lloyd-George, distinguished Civil Servants from those departments associated with the interests of food, and representatives of the various Research and Trade Associations and of the technical and national Press, were received by the President, Mr. Colin S. Dence, and the Director and General Secretary, Mr. F. J. Lawton.

Pulley Fitting in 13 Seconds!

The time taken to file and fit pulley keys can be considerably reduced by the use of Taper-Lock patented pulleys. The bush gives full bearing surface on the shaft throughout the length of the hub, thus eliminating wobble at its source. There are no protruding parts, and no flanges or collars, so that the complete safety of flush fitting is an added advantage.

Exclusive manufacturing and selling rights in Great Britain and the Commonwealth have been placed in the hands of J. H. Fenner and Co.



The new steriliser-cooker installed at the factory of Norfolk Canneries.

Canning in Norfolk

A new steriliser-cooker was recently set in motion by Mr. Andrew Duncan, managing director of Norfolk Canneries. Supplied by Mather and Platt, this new rotary steriliser has been made to cook and cool plain or lithographed 8 oz. cans of peas and baked beans at a speed of 400 cans per minute. It embodies all the latest refinements, including valves of modern design with a special safety device, rotor angles and twin track spirals, automatic controlling and recording temperatures, automatic air escape valves, and automatic lubrication.

Other modern machines of Mather and Platt manufacture at this cannery include pea pumping units, Sterowasher, 15 ft. stainless steel centreshaft blanchers, rod washers, 5-pocket pea and bean fillers, single tier exhausters, and a Grovesend grader. The main vining station of Norfolk Canneries at Fakenham is equipped with a number of Mather and Platt super viners and winnowers.

Aromatic Chemicals and Flavours

The formation of a new company, to be known as Schimmel Boehm Ltd., is announced by Schimmel and Co. Inc. of New York and Fredk. Boehm Ltd. of London. This company will combine the aromatics business of Boehm with the production in the United Kingdom of the well-known Schimmel specialities, for sale in the United Kingdom and the Commonwealth, and to areas where it may from time to time be advantageous to transact business in sterling.

Fredk. Boehm Ltd. is no newcomer to the aromatic field, having dealt in essential oils, aromatic chemicals, perfumes, and flavours for many years. Since the war, a flourishing business has been built up in manufactured tailor-made perfume compounds for a wide range of industries. This manufacturing operation is now carried out at a new factory at Belvedere, Kent. The new company will be administered from 19, Bentinck Street, and Mr. J. A. Clark, formerly Boehm's aromatics sales manager, will control the buying of raw materials and the sales staff.

It is planned eventually to offer the whole Schimmel range, but this extensive undertaking may take some time to complete. However, operations commenced in August and the new company is in a position to deal with enquiries for Schimmel materials.

The new company will continue to act as merchants for essential oils and will naturally handle the Schimmel American oils, including their range of peppermint, spearmint, orange, and grapefruit.

New Biscuit Tin Design

An interesting development has arisen out of the decision of W. and R. Jacob and Co. to install new plant in their Dublin factory for manufacturing tins, their previous equipment having become obsolete.

In studying the problems involved, particular attention was paid to the lip of the tin, which hitherto had been curled inwardly. In use, it was possible for particles of dust and biscuit crumb to lodge inside and under this lip, which was formed over the wire. It was decided that it would be better to curl the top of the tinplate to the outside, thus giving greater visibility and accessibility during the cleaning process. As a further improvement, the tinplate was cut to leave the corners of the lip open, so that when the tin is hung to drain, water from inside the lip and the crevices can escape easily at the corners. It was also arranged that the wire over which the lip is curved, which previously had been cut and inserted in two unjoined L-shaped pieces, should be treated as a complete frame, with the joint welded.

Apart from the major advantage claimed for the new design that it permits more hygienic cleaning, it has been found that the working life of the new tin is longer. The cost of manufacture compares favourably with the old, while the specifications for the sheet tinplate and wire have not been altered, neither is there any variation in the measurement.

New automatic plant is now turning out square, half-size, and other standard types with the new style lip.

The company are not in a position to supply the tins to the biscuit industry, but the Patentees are prepared to negotiate arrangements for the manufacture and/or use of the design under licence.

Prepacked Biscuits

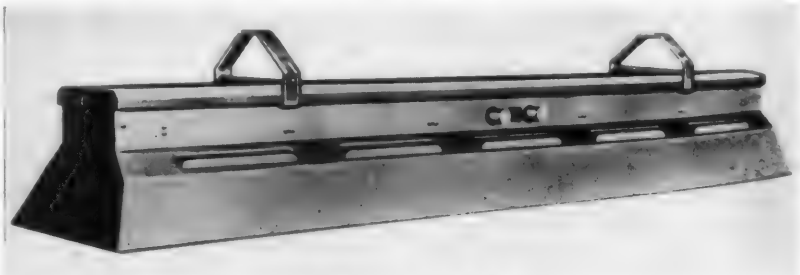
Coconut Macaroons (packed in heat sealed transparent film bags), Ginger Nuts, Shortbread, Petit Beurre, and Arrowroot biscuits all packed in self-display Cellophane wrapped packets are now being marketed by Lloyd Rakusen and Sons.

Lighting Range Extended

A new additional range of Flurolier fittings, Peropal finish, achieved by a new technique of high temperature stove-enamelling, embodying a synthetic resin providing the maximum protection and durability, is being manufactured by Benjamin Electric.

The new range has been specially developed for light industrial needs and those departments of factories where the conditions are reasonably clean and dry.

A wide variety of fittings is available which simplifies the planning of lighting installations.



A Benjamin upward light model for two 80 watt 5 ft. lamps.

Brewery Plant on Show

A wide range of brewery plant, covering most of the principal items of plant required in the brewing process, and some used in the bottling store, will be shown by APV at the 1954 Brewers' Exhibition.

Prominent among the exhibits will be the present-day range of Paraflows, and complete plants of a Paraflow wort cooler, beer chiller, beer pasteuriser, sugar cooler, and for returned beer reclamation.

The company's fabrication work in stainless steel will be represented by an insulated 10-barrel beer storage tank, bright beer tank, yeast wagon, and by a pasteurised beer receiving tank.

The re-designed stainless steel hygienic pumps, gunmetal liquor pumps, and a range of stainless steel and gunmetal pipe fittings will also be displayed.

Flexible Packages

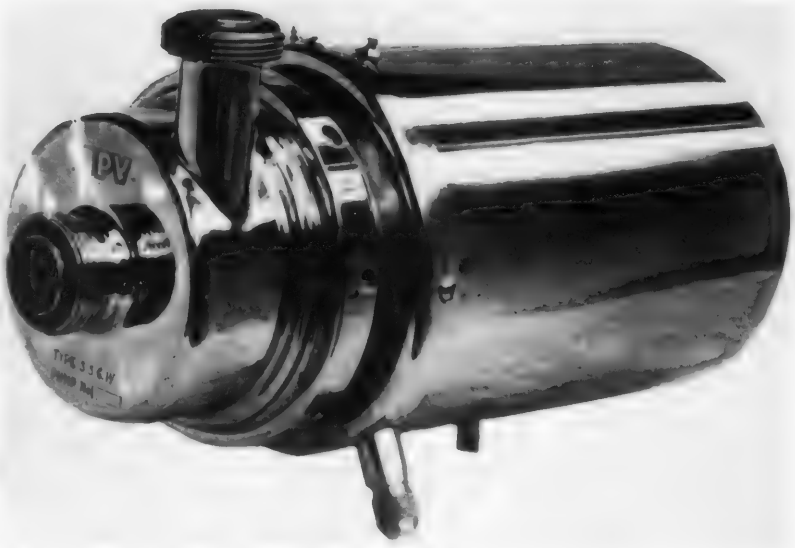
A full range of flexible packages and packaging materials is now available from the Metal Box Company, who recently acquired Flexible Packaging Ltd. of Portsmouth, and Brown, Bibby and Gregory, of Speke.

Large scale expansions both in factory space and plant are already in progress at Speke and at Portsmouth. This will result in further developments in the wide range of laminations and laminated packages already marketed by Brown, Bibby and Gregory under the trade names of Metalam, Translam, etc., and in multi-colour printing, bag-making and coating with Diothene, the trade name for the polythene produced by Flexible Packaging.

Closure Manufacturers' Association

The extension and improvement in trade following the removal of controls were commented on by Mr. John Ryan, chairman of the British Closure Manufacturers' Association, on the occasion of the annual general meeting of the association. The threatened shortage of tinplate which might have been created by the closing of many old mills had, to a great extent, been offset by exceptional production from the strip mills. Mr. Ryan also reported progress in the possibilities of producing a standard specification for tinplate, a subject which was being examined by the British Standards Institution and a Technical Committee on which the association was represented.

The Council, appointed at the annual general meeting, is as follows: Mr. John Ryan (chairman), Mr. J. H. Huxley (chairman of the Technical Committee *ex officio*), and Messrs. T. Arbuckle, E. A. Blanch, R. W. D. Carr, W. R. Gamble, H. R. Marsh, B. Rawlinson, E. P. Smith, and R. E. Somerton.



A new range of APV stainless steel pumps has been produced in 1½ and 2 in. sizes.

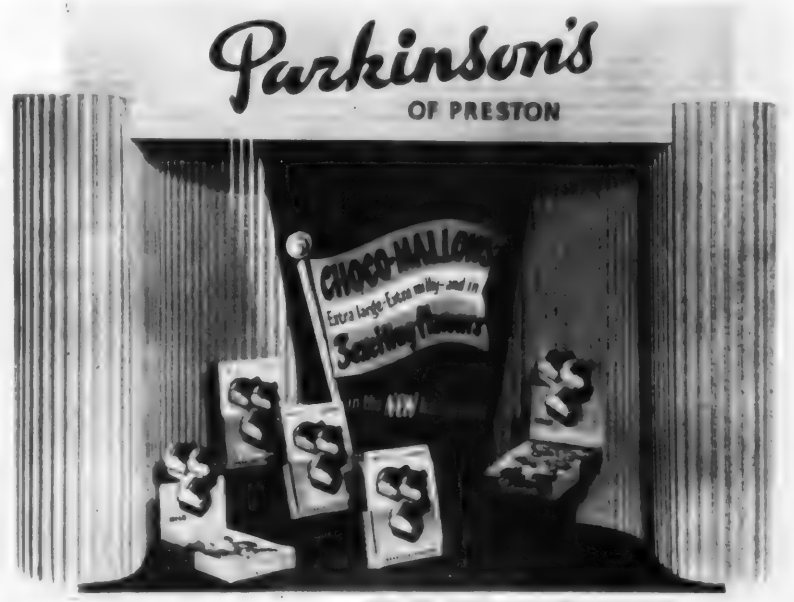
Medal for Gallantry

Mr. Edward Anglum, assistant foreman at Howards of Ilford, has been awarded the B.E.M. (Civil Division) for gallantry shown when he and others fought a recent fire at their factory.

Crumbing and Mincing Machinery

Used in the reclamation of broken biscuits and cakes, crumbing bread for rusks, mincing vegetables for preparation of soups and purées, apples for mincemeat, and fruits for preserves, the Peck-Mix S.A. mincer and crumber has easily fitted screens for controlling the size of the processed material and a horizontal revolving plate for cutting.

The machine, which is economical in space and h.p., has a high output; for example, one operator can powder or crumb 1 cwt. of biscuits or mince 1 cwt. of apples in five minutes. Its automatic closing chutes eliminate the possibility of injury and the action is so simple that it can easily be operated by unskilled labour. There are no complicated parts to dismantle when cleaning; the cutting plate is lifted from the container which is flushed through with water and dried, and the screen is easily released by opening the outlet chutes. The manufacturers, Rowe Bros. and Co., consider that there may be other applications for this machine and would welcome samples of materials for processing at their works.



A new style handy pack display Choco-Mallow carton, introduced by Parkinson's, contains six Choco-Mallows, two of each flavour—strawberry, vanilla, and coffee.

The Electrolux laundry unit installed at the factory of Brown, Wills and Nicholson.

A Factory Laundry

Over 700 garments a week are washed by means of the Electrolux laundry equipment installed at their Plymouth factory by Brown, Wills, and Nicholson, manufacturers of the Beechwood brand of sausages, meat pies, cooked and canned meats, and cooked hams and tongue. Articles washed include white Chester coats, white wrap-overs, denims, trousers, aprons, dish cloths, and hand towels.

Employing 400 during the peak period of the pilchard canning season, another of the company's enterprises, Brown, Wills, and Nicholson supply each employee with two white overalls a week. The washing of these overalls, made difficult by the presence of blood and grease stains, imposed a heavy strain on the company's old laundry unit.

The new Electrolux equipment, operated by two full-time workers, is steam operated and consists of two washing machines, one hydro extractor, and one truck tub.

Recommended Names for Chemicals

The British Standards Institution has recently published B.S. 2474, "Recommended names for chemicals used in industry." This standard comprises two parts, the first and larger giving recommendations on the names to be used for chemicals and the second part giving a list of recommended names for grades of certain of these. Names which are undesirable on grounds of safety, ambiguity, etc., are listed as "deprecated" and others, which may in some cases be systematically correct, but which are not recommended for industrial use, are given as "non-preferred." The list does not purport to be complete, but where chemicals which form the basis for extensive trade are omitted, it is generally because a related compound will provide a guide to the naming of them.

Supervisory Training in Food Canning

The necessity for training at all levels in industry has come to be regarded by management as one of the most important ways in which efficiency can be increased. Of equal importance is the contribution to the morale of employees and to human relations generally.

For some years, Batchelors Peas have run comprehensive training programmes of this kind for executives, salesmen, and supervisory staff.

Recently nine trainee supervisors at their Sheffield and Worksop factories began a 10-day course of talks and discussions with training films, film strips, and visits to all sections and depots of the factory.

A modern food canning factory with a high rate of output such as Batchelors, whose production recently topped over a million cans in one day, has many problems to contend with. The handling of food demands high standards of personal and factory cleanliness, and depends on the co-operation of all to ensure that these are maintained.

The variety of products means familiarity with many different processes by the staff. The canning of seasonal crops, such as garden peas and fruits, without interruption to standard products, means a rapid increase of unskilled labour which must be fitted into production operations without any pre-training. The immediate control of this type of labour is the responsibility of supervisors, who must establish good relations with these temporary workers from the start. They must be able to explain, in simple terms, a wide range of operations, and fit these workers into a production line without slowing down or interrupting it. Finally, they must ensure that the rules about cleanliness are understood and accepted readily, and that the workers are made to feel at home.

The trainee supervisor course is designed to cover all aspects of company organisation from raw materials, sales, production study and methods, work flow, hygiene and plant sanitation, costing and wages, to general administration.

Emphasis is placed on the responsibilities of supervisors and four complete afternoons of the course are devoted to talks and discussions on these aspects which range from training, discipline, human relations, and management liaison to safety and the quality of the work.

Since this course was instituted, 26 supervisors have been trained in this manner.

New Telephone Numbers

The telephone numbers of the London office and laboratory of Dr. J. G. Davis and Partners are now GERrard 2582 and 4672.

*

The telephone numbers of A. L. Marshall (Carlton) are now Nottingham 24-8212, 24-8213, and 24-7163.

ERECTIONS AND EXTENSIONS

Plans are being made by Clifton Chocolates to enlarge their factory at Manor Road, Levenshulme, Manchester.

■

Plans have been approved for R. Lawson and Sons, bacon curers, to carry out extensions to their factory at an estimated cost of £65,000.

■

The erection of a new bakery and garage on Harraby Trading Estate, near Carlisle, is planned by W. C. Roberts (Carlisle), bakers and confectioners.

■

Extensions to their factory premises in Kyle Road, Gateshead, are now being carried out by Dandy Confectionery Co.

■

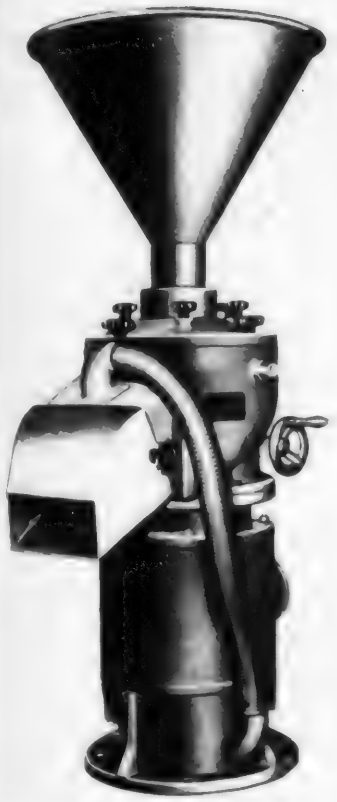
A new extension to their packing station at Goods Yard, West Worthing, Sussex, is being planned by Farmers and Growers Industries.

■

Claimed to be the largest and most modern of its kind in the world, a new soft drinks factory is being erected in Chelmsford, Essex, by British Vitamin Products.

■

The construction of a new £1,000,000 factory on a site at Fawdon, Newcastle-on-Tyne, is proposed by Rowntree and Co., chocolate manufacturers. This scheme covers the purchase of 26 acres of land, and the new factory would provide employment for 800 people.



The Fryma carborundum stone mill.

High Speed Mills in Food Manufacture

The basic principle of the high speed carborundum stone mill is the utilisation of the highly abrasive action of the various types of carborundum grits which are available today. These, when correctly bonded together in the form of abrasive discs of specially constructed shape, provide the perfect media for obtaining a first class grind on practically every known paste-like material, regardless of its ingredients.

The Swiss manufactured Fryma carborundum stone mill consists basically of a specially shaped housing containing the abrasive discs, or stones as they are called. The lower stone, known as the "rotor," is designed to rotate at either 3,000 or 5,400 r.p.m., while the upper stone, known as the "stator," is stationary. Provision is made for varying the distance between the stones so that the desired consistency of grind can be obtained at a specific clearance and then duplicated on a later occasion by use of the machine's calibration.

One of the primary improvements over the other types of mill is the complete absence of "taste" which occurs when material is crushed and abraded under the action of metallic rolls or balls. This can be accounted for by the fact that a finer degree of shear is generally obtained owing to the smallness of the grits used in the stones; these are self-dressing and practically non-wearing; thus a clean sharp shearing face is always kept to the materials being ground, resulting in the greater release and more even distribution of the flavours.

Such heavy pastes as peanut butter can be quickly and efficiently worked up into the finished product, the roasted and graded nuts being fed directly into the mill together with the remainder of the mixture, usually syrup or other stabilising materials. Cocoa bean is usually worked up after pre-crushing on what is termed "the tandem process" whereby the original grind is made, using a coarse grade of stone and special small diameter impeller, followed by a second grind, using a standard impeller and fine, hard grade stones, thus obtaining a smooth homogeneous paste, ideal for chocolate manufacture.

For the manufacture of sauces for use either direct or with canned fish and meats, the carborundum stone mill grinds, mixes, and emulsifies in one operation. At the same time, all spices and other additives can be added in the solid state with a guarantee of complete pulverisation, giving a 100 per cent. taste effect and a proper suspension of the particles in the sauce being manufactured.

Fish can be ground together with the bone, this latter disappearing during the grinding operation, and several manufacturers of anchovy, sardine, shrimp, crab, salmon, and salmon substitute pastes are using carborundum stone mills with great success, partly owing to high throughputs being obtained and partly owing to the avoidance of tainting caused by the heating effect of the metal balls rotating at high speed.

Among the food products advantageously handled by these machines are apple sauce, spice extracts, berries in paste and jelly form, citrus products, stable emulsions of fruit juices, fish pastes, meat pastes, sauces of every type, mustard, soup and soup pastes, tomato pastes, syrups, baby food, biscuit mixtures, jams, vegetable pastes, and colourings, as well as the raw materials used by the confectionery industry.

Data concerning the performance of these mills on many food manufacturing materials can be supplied by Bowser, Monks and Whitehouse.

Essence Strawberry Witham

A new strawberry flavour, to be marketed under the description "Witham Strawberry Flavour," has been introduced by W. J. Bush and Co. The name is derived from the town of Witham in the Essex fruit growing area where the company have their fruit processing factory. This is the first of a series of Witham flavours. Economical in use, it is particularly suitable for high boilings, fondants, and jelly work.

APPOINTMENTS AND RETIREMENTS

Mr. Towner M. Smith has been appointed marketing director of Alfred Bird and Sons.

*

Mr. Derek J. Hayman, formerly commercial manager of The Distillers Company (Biochemicals), has been appointed sales director.

*

Lt.-Col. Maurice W. Batchelor, J.P., chairman of Batchelors Peas, has been elected a member of the Council of the Incorporated Society of British Advertisers.

*

Mr. James D. Devey, B.Sc., has been appointed Chief Chemist of the C.W.S. Preserve Works. Mr. Devey's previous appointments were with Chivers and Sons, and the Food Research Department of Unilever.

*

The board of Peerless and Ericsson have appointed Mr. W. J. Worsfold, hitherto managing director of their Canadian subsidiary company, sales manager of the parent company. Mr. Worsfold took up his new post on July 5, after a successful sojourn in Canada.

*

Dr. F. H. Banfield has accepted an invitation from the Committee of the Privy Council for Scientific and Industrial Research to become a member of the Food Investigation Board and Pest Infestation Research Board.

*

At a recent meeting of the board of directors, Mr. N. F. Patterson was appointed a director of Monsanto Chemicals.

Mr. Patterson, who joined the company in 1946, became works manager at Ruabon in 1947, and in July, 1949, was appointed general manager of production, with responsibility for all the production operations of the company.

He is also a director of the subsidiary companies Monsanto (Soil Conditioners) and Monsanto Plastics.

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25 Years' Service

The fifth annual dinner to commemorate 25 years' service of Thames Board Mills' employees was held at the Club House, Aveley, on July 10, when suitably inscribed gold watches were presented by Mr. W. J. Alford, chairman, to 62 members of the company. Since the inauguration of this annual event, no less than 690 watches have been presented to people with 25 years' service.

Following the dinner and presentation ceremony, members and guests enjoyed an after-dinner show presented by Bill Scott-Gordon.

Five Acres of Food

Food from home and overseas will be featured at the third British Food Fair to be held at Olympia from September 7 to 18.

Cookery

Displays of cooking by some of the world's experts will be staged by the Gas Council in their "International Kitchen." This exhibition of special dishes of at least 16 countries and demonstrations of how they are prepared will present a colourful scene as the teams from each nation will have individual kitchens, decorated in a scheme of colour and design characteristic of the country, with many of the demonstrators wearing national dress. The latest gas equipment will be used and visitors will be able to inspect this and the wide range of appliances also to be exhibited.

▪

A battery of four of the latest electric cookers, each with automatic time-switch control, will be used at the stand of the British Electrical Development Association to demonstrate the latest developments in automatic cooking. Another feature of the stand will be the demonstrations of coffee making by electricity using the latest type of electric coffee percolators and coffee making machinery. There will also be a mass display of cookers, refrigerators, water heaters, and small electric appliances and during part of each day demonstrations of cold cookery will be given.

Canned Foods

The main feature of the stand of the Canned Foods Advisory Bureau will be a large display of canned foods of all descriptions. In addition, the stand will incorporate a replica of a dining room, in which the table will be set with the first course of a meal for three people; on the sideboard will be the main course ready for serving, together with a choice of sweets, all the dishes having been prepared from canned foods.

Food Products

The story of honey from the gathering of the nectar by the bees to the delivery of Bear Brand bottle honey to the shops will form the background to the stand of The Bear Honey Co.

In addition to the special Food Fair pack of 3×2 oz. jars of assorted honeys in cartons, a full range of the company's other packs will be available. Of these, special mention should be made of Orange Blossom Honey from Israel and New Zealand and Greek honey, all of which are specialty types having their own distinctive colour and flavour.

The company will also welcome trade enquiries for bottled and bulk honey for home and export purposes.

▪

A full range of margarine, cooking fats, and allied products will be displayed by Benninga (Mitcham). These will include Wayside and B.B.M. table margarines packed in foil wrappers, Sunniface margarine specially vitaminised for children, Green Circle Brand margarine, Vitsu shredded beef suet, White Spray domestic cooking fat and dripping, and a range of cake and pastry margarines for the bakery trade.

The central feature of the stand will be a Kustner packaging machine which will be shown in continuous operation wrapping sample packets of margarine in printed foil.

▪

On show for the first time will be the Swel Instant Mixes, marketed by F.M.S. (Farm Products). Although these mixes have been available to the caterer and food manufacturer for some months, the company have only recently introduced them into their Swel range of foods packed for domestic use. They are being marketed in 2 oz. vacuum packed Pliofilm bags with colour identification tags to distinguish the four varieties at present available — chicken, fish, tomato, and green pea.

Prepared dried vegetables will also be shown, the present range including peas, mixed vegetables, carrots, onions, and beetroot. These vegetables are packed in heat-sealed Cellophane bags containing 2 oz. of vegetables yielding the equivalent of 1½ lb. of fresh vegetables.

▪

Visitors to the Cadbury stand will be able to watch the process of coating biscuits with milk chocolate.

▪

Designed in modern style, the Allinson stand will be dominated by an animated windmill, symbolising the company's trade mark, surrounded by shelves containing specimens of the firm's range of products. A photographic sequence, showing the production of wholewheat flour from field to bag, will form an interesting pictorial background.

Allinson products, as well as loaves, cakes, and confectionery made with wholewheat flour, will be on sale to the public.

▪

Displays of many new types of sausage products and cooked meats will be featured on the stand of The Oppenheimer Casing Co. The actual manufacture of the products will be demonstrated from the cutting of the fresh meat to the cooking. Syplex manufactured casings will be used exclusively for the production of all fresh sausage on the stand at which other exhibits will be Hypak printed casings.

Syplex manufactured casings being used for filling pork sausage.

A flow chart showing the story of the whole production of gelatin will be displayed by P. Leiner and Sons. Samples of the final product will also be shown, together with illustrations of a range of food products in which edible gelatin is an important ingredient.

▪

The range of Ulster products to be shown on the Northern Ireland stand will include both natural and processed food; potatoes, apples, eggs, poultry, ham, bacon, meat packs, and canned and processed goods, including several which will be making their first appearance from N. Ireland on the English market. A novelty will be a tank of live eels from Toome, as regularly sent to the London consumer.

▪

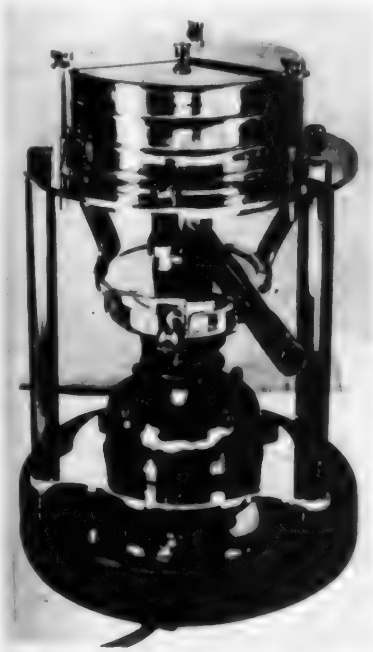
Food Equipment

A back projection machine with mirrors incorporated in such a way that scenes will be made to disappear and new ones appear will be featured by Thomas De La Rue and Co. Viewers will see a photographic reproduction of an old kitchen fading into a view of a full size modern kitchen with all working surfaces covered with Formica laminated plastic.

Also to be demonstrated will be examples of contemporary and kitchen furniture incorporating Formica, and murals will depict the ease with which such surfaces can be cleaned.

▪

Among the machinery to be exhibited by Russell Constructions will be the variable speed model for super sieving and straining effects on extremely fine meshes; a general purpose sieving and straining unit; the Cascade stand model for sieving and straining with high rate of throughput and continuous rejection of oversize material; a straining and dewatering unit with outputs of up to 6,000 gallons per hour on 200 mesh; and the laboratory stand model for sieving and straining.



The Russell laboratory bench model.

OBITER DICTA

● The written word is the fodder you must digest to create your style — or choke with it. —*R. Erridge, writing in "Bakers' Review."*

● Almost every piece of wedding cake sent to me is an amalgam of what looks like congealed soot, armour-plated by a coating of plaster of paris. —*The Reverend W. I. Bulman, vicar of St. Gabriel's, Kilburn, London, N.W.*

● Instead of increasing their own pay, M.P.s should be campaigning for the removal of taxes on the peoples' food. — *Oliver Smedley, chairman of the Cheap Food League, and member of the Liberal Party Executive, protesting against high vegetable prices.*

● The farmers were teasing the butchers at Banbury market, if teasing is not too girlish-giggly a word for such beefy badinage between such red-faced men.—*Cyril Ray, writing in the "Sunday Times."*

● A sausage roll, that loveless lump, that so often leaden, lingering portion of undesirable dullness, is usually eaten when judgment is overwhelmed by animal appetite. — *Rex North, writing in the "Sunday Pictorial."*

● They're putting female sex hormones into beef. they say, to make it more tender, they're giving cows antibiotics, and feeding livestock with all sorts of chemicals nobody knows anything about. It is no wonder people in the United States are always getting sick.—*Miss Gloria Swanson.*

● It is often said that fish makes brains. How true that is I leave to your judgment; but one thing is true—Grimsby is the largest fishing port in the world. — *Alderman W. H. Windley, speaking at the Scarborough conference of the National Association of Master Bakers.*

● I do not want to underestimate the seriousness of food poisoning, but I reckon with some pride it would take a man eating three meals a day in a restaurant for six days a week some 1,400 years before he was in danger of food poisoning in England.—*Mr. A. E. Burdell, managing director of a large catering organisation, speaking at the annual conference in Glasgow of the British Medical Association.*

BOOKLETS RECEIVED

A leaflet describing the Bantam mobile shop has been issued by Karrier Motors.

▪

Details of the Fumite pesticidal smokes for industry and the home are contained in a pamphlet published by Waeco.

▪

A confectionery catalogue, published by Batger's for distribution throughout the world, contains full colour representations of the company's range of brands.

▪

To mark the decontrol of milk products, Benger's have published an illustrated brochure depicting processing operations at their Coleraine milk factories in Northern Ireland.

▪

How to choose a gas refrigerator, the correct method of cleaning and stocking the cabinet, and the positioning of different foods are dealt with in a recent Gas Council booklet, "Food from the 'Fridge'"; also included are a number of attractive "cold food" recipes.

▪

The current issue of the journal issued by the Fire Protection Association contains some interesting articles on fires and their causes, together with technical notes on such subjects as explosions in domestic flues, spontaneous heating in groundnuts, pressure-fed paraffin oil stoves, and foamed rubber.

▪

An attractive brochure entitled "Drinks All Round," published by York Shipley, deals with every aspect of refrigeration for the beverage industry, including maltings, yeast and hop storage, beer cellars and refrigerated display, brewery refrigeration, wine cabinets, carbonation, and catering.

▪

A new price list, which has been elaborated to contain illustrations and notes on some of the more common insect pests encountered in industry, has been published by Cooper, McDougall and Robertson. Two additions to the range of products are Bactaire, for reducing airborne bacteria, and Mothaire, for controlling infestations of clothes moths on fabrics.

World Food News

FORTHCOMING EVENTS

Inorganic Chemistry

Under the auspices of the International Union of Chemistry, a conference on Inorganic Chemistry will be held at Münster from September 3 to 5, 1954. It will be specially devoted to the study of the problems appertaining to silicon (with the exception of silicates and silicones), phosphates, and compounds of sulphur. Further details are available from the Secretary of the Inorganic Chemistry Section of the Union, Prof. J. Benard, 11, Rue Pierre Curie, Paris, France.

Parasite Threat to Italian Crops

The grain harvest in many farming areas around Modena is threatened by a parasite which was responsible two years ago for the poisoning of many people in two French cities. Announcing this, the Modena Agricultural Equipment Station said the parasite, a poisonous fungus called *Claviceps purpurea*, was spreading through the cornfields of Reggio Emilia and Modena provinces.

No machine exists for separating the fungus from the stalks; this will have to be done by hand.

Fish Meal Research

In Bulletin No. 22 of the Fishing Industry Research Institute, Cape Town, are reported studies made of the effect of small variations in different processing conditions on the colour and flavour of edible fish flour. As a result a flour was made which was far superior to any ever tested at the Institute in so far as freedom from flavour is concerned, although the product was somewhat darker than usual. The finding, however, is being followed up.

A process was successfully evolved for refining the solvent recovered from the extraction process, so that it could be re-used without imparting any flavour to the subsequent batch of meal extracted. The significance of this work lies in the fact that distillation, and even fractional distillation, did not remove all offending substances.

Preliminary investigations into the practical details of a recently published method of determining biological values are in progress. If the method proves to be as satisfactory in practice as it appears to be in theory, it will prove to be of considerable interest to the Institute in its further work in this direction.

An investigation of the factors relating to the spontaneous combustion of fish meal includes studies on the oxygen absorbed by it. It was found that the addition of small quantities of water (up to 10 per cent.) resulted in correspondingly greater absorption than the controls, after 24 hours. In some cases, the addition of water resulted in an initial induction period (up to seven hours) during which the rate of absorption was lower than the controls. Addition of the water at any time (up to five hours) after the start of absorption, however, resulted in an immediate corresponding increase in rate and total absorption. It was found that the higher the temperature, the greater was the total absorption.

How to Bake Australian Bread

Mr. H. W. Gay, chief instructor at the Bread Research Institute of Australia, has been instructing employees of the joint Arabian-American Oil Company, at Dhahran, on the Persian Gulf, in the latest Australian baking methods. American bakers are not used to Australian flour. He took with him 30 tons of Australian flour, yeast, sugar, fat, and milk powder.

Wheat grown in Australia is softer than most other varieties and has a lower gluten content. Bread made from it suits Australian taste, but other countries sometimes blend Australian wheat with other varieties to build up the gluten content and make a richer baking mixture.

Mr. H. W. Gay checks the texture of bread baked at the Bread Research Institute.

Bakery Sanitation Standards

Two further sanitation standards have been issued by the U.S. Baking Industry Sanitation Standards Committee; these are concerned with horizontal and vertical mixers and conveyors.

Sugar Store and Yeast Factory

Mackay Harbour Board, Queensland, is to spend £1,250,000 on a new bulk sugar terminal at the city wharves. Mr. A. F. Hamilton, the Board chairman, said recently that the plant, the first of its kind in Australia, will be able to load 600 tons of sugar an hour into a ship. The scheme also involves the provision of special storage facilities. A bulk-handling sugar plant is also planned for Lucinda Point.

The Toowoomba Council, Queensland, is to spend £500,000 on secondary industry projects. One of these is a compressed yeast factory which will supply most of Queensland's needs.

Food Research in India

The aims and functions of the Central Food Technological Research Institute at Mysore were outlined in a recent address by N. L. Jain.

Some of the food problems investigated at the Institute have been concerned with the production of a substitute for rice. Such a product has now been made successfully from a mixture of tapioca flour and defatted groundnut flour. Investigations having proved encouraging up to the pilot plant stage, large scale production is now being attempted.

In the field of fruit and vegetable canning and preservation, some of the new canned products are: canned jack fruit, banana, guava, cashew apple, musk melon, orange segments, and curried vegetables. Beverages and candy have been made from cashew apple; vitamin C concentrates and syrups from amla; guava jelly powder; pectins from papaya, wood apple, and jack fruit wastes; and pickles and chutneys from tender bamboo shoots. Various fruit juice concentrates have also been made.

Some glut fruits, such as mango, monsoon season oranges, and wild plums, have been used in the preparation of good quality wines, while the use of tamarind for the preparation of tartaric and citric acids and pectin is also being investigated.

Other work has been concerned with the production of starch from the banana pseudostem, the cold storage of fruits and vegetables, and the use of the husk of the coffee bean as a suitable substitute for chicory in French coffee.

Appointment

The manager of the N.V. Chemische Fabriek "Naarden," Mr. C. M. Nienhuys, has been appointed Deputy Director of the company. Mr. Nienhuys, who studied economy at the Municipal University of Amsterdam, joined the company in 1949.

Water Pollution Decree

The Hungarian Government has issued a decree declaring that no new industrial enterprise may be established without provision for purification of any polluted water emitted in an industrial process. Existing industries are directed to install or modernise equipment as required with the aid of £7,500,000 State credit.

Australian Wheat Standard Fixed

That Australia expects to have 120,000,000 bushels of wheat available for export this year with a higher protein content than last year, was the view expressed at a special meeting in the Sydney Chamber of Commerce convened to fix the standard for the year's wheat crop.

The standard, known as the "f.a.q."—fair average quality—is established by Chambers of Commerce in the four leading wheat growing States (New South Wales, Victoria, South Australia, and Western Australia) and is used as a basis for sales of each season's crops.

In 1954, the Sydney Chamber of Commerce fixed the f.a.q. standard at 64 lb. for both bulk and bagged wheat. The previous year's standard was 64 lb. for bulk wheat and 65 lb. for bagged.

F.a.q. is an Australian term which has no parallel overseas. Canada, for instance, sells her crop according to fixed grades; other wheat countries offer theirs for sale by sample.

The practice in Australia is for each Chamber of Commerce to obtain samples from each of their growing areas, mix them in proportion to deliveries, and then determine their quality by weight.

The annual meeting which fixes this standard carries out an impressive little ceremony. Representatives of some 40 millers and growers sit in chairs ranged along two sides of the Chamber's main meeting room; facing them is a table with two brass-fitted Schopper scales. Officials from the New South Wales Government's Weights and Measures Department measure the samples.

On the floor behind are two heaps of winnowed wheat, spread out on tarpaulins, one representing bagged wheat from the various growing areas, the other bulk wheat from the many large silos inland.

A number of samples from each heap is weighed in a one-litre scale chondrometer. Results are averaged and the standard finally expressed in terms of pounds weight.

The imposing façade of the Microbiological Laboratories at Rutgers University.

Monument to Streptomycin

During his recent American tour, Mr. W. Leonard Hill, Chairman of Leonard Hill Ltd., visited Rutgers University and was conducted round the University's new Microbiological Laboratories by Dr. Olin Ball, a research specialist in the Department of Food Technology at that University.

The official opening of the laboratories on June 7 marked the tenth anniversary of the discovery of streptomycin by Dr. Selman A. Waksman, a Nobel prize winner. By virtue of the arrangements made with their research workers, the profits accruing from the commercialisation of their discoveries go to the University and this new laboratory is the visible result of the success of streptomycin.

The building provides a remarkable instance of a man living to see the monument to his own success, for Dr. Waksman was present at the opening and is to be the Dean of this Department.

Some of the equipment in the new building includes pilot plant by Intal Equipment Co.; freeze drier by F. J. Stokes; hydraulic test pressure kettle with maximum temperature of 650° by Merck and Co.; electrical incubator by Stomes Systems, Inc.; pumps by La Bour; rotary filter of a new type by Filtration Engineers, Inc.; and a jacketed retort of a novel design.

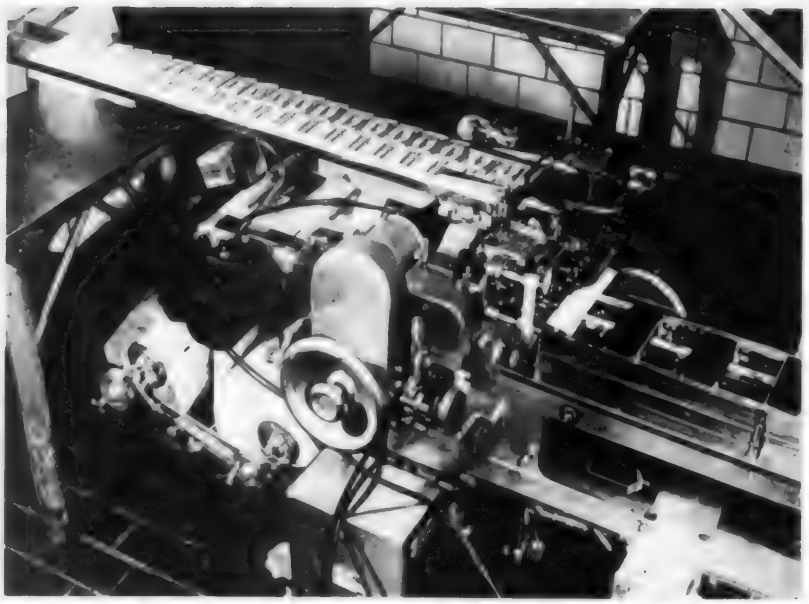
Norwegian Herring Catch

The final results of Norway's herring fisheries are now available. Altogether approximately one million tons have been caught at a firsthand value of £10,550,000. In 1953, the total catch was about 650,000 tons at a firsthand value of £6,250,000, and in 1952 approximately 800,000 tons at a firsthand value of £7,850,000.

About 80 per cent. of the catch was bought by the herring oil factories and has been converted into meal and oil.

From January 1 to May 1 altogether 200,000 tons of meal have been produced of which about 30 per cent. is consumed on the home market and the rest exported. The total production of oil in the same period was 90,000 tons, which has also been disposed of on the home market or exported. The total value of the meal and oil is estimated at £17,300,000.

Officials weigh a sample of winnowed wheat at the Sydney Chamber of Commerce.



Continuous automatic production line for ice cream.

Ice Cream Sandwiches

A new development in ice cream sandwiches is announced by Swift Co., who have installed a continuous automatic production line turning out 100 sandwiches per minute.

Ice cream from the freezer flows through a hose to an extruder opening on to the new machine. The ice cream must be stiff as it extrudes between the wafers so that it will stand up without running over and enable the sandwiches to break clean.

The whole operation is carefully synchronised with two dispensing chambers for the wafers situated at the top of the machine

The unwrapped sandwiches move along a conveyor to the packing station where an elevator mechanism raises the sandwich to the plastic coated paper fed from a roll. The paper is automatically folded and tucked neatly around the entire sandwich and heat sealed; the wrapped sandwich is then carried to an automatic conveyor for boxing and delivery to the hardening room.

The machine, constructed by the Lynch Corporation, is on casters and can be moved around.

Italian Trade Fairs

The British Consulate-General at Milan has recently reported on the 1954 Padua Packaging Exhibition, held from May 29 to June 13.

The report points out that, despite a tendency for the Fair to become "popular," the trade sections were of a high standard and merited stronger United Kingdom participation than was apparent this year.

The reputation of the Padua Fair has been built up on its packaging and cold storage sections and United Kingdom firms are advised to give serious consideration to the question of participation in these sections next year.

The Consulate-General is of the opinion that consumer goods can probably be exhibited with better sales results in the specialised consumer goods fairs, *e.g.* Bologna (food, electrical appliances), Parma (preserved foods and packaging), Busto Arsizio (cottons, rayons), or in the regional general samples fairs, *e.g.* Bari, Palermo, or in the Milan International Samples Fair.

Information about the Padua Fair and other Italian Trade Fairs may be obtained from the British Chamber of Commerce for Italy Inc. (Fairs Division), 37, Corso Venezia, Milan, or from the United Kingdom agents of each Fair.

OVERSEAS ENQUIRIES

Foodstuffs, Seeds, and Fertilisers

Mr. Joseph Piemonte of Coleman International Corporation, 165, Broadway, New York City, would be interested in receiving offers for agency or representation for such lines as biscuits, jams and marmalade, canned fish and packed goods, plum puddings, confectionery, and seeds, fertilisers, and similar agricultural lines.

Manufacturers interested in this enquiry should write, by air mail, to Mr. Joseph Piemonte giving full details of their products, c.i.f. prices in U.S. dollars, etc.

*

Grain Milling Plant

"Chanic" scrl. (Chantier Naval et Industriel du Congo), P.O. Box 206, Leopoldville, Belgian Congo, wish to obtain as quickly as possible the exclusive representation in the Belgian Congo and the Ruanda Urundi of a firm producing hammer mills (*moulins à marteaux*) for grinding manioc, maize, and other similar products.

The types of grinder which are most suitable for their market are:

1. A small capacity mill with hourly output of 1,100 to 2,200 lb. of flour. Necessary power 8 to 10 h.p. maximum. To grind very fine—sieve $\frac{1}{32}$ to $\frac{1}{16}$ in.
2. A large capacity mill with hourly output of 1 to 2 tons of flour. Necessary power 20 h.p. maximum. To grind very fine—sieve $\frac{1}{32}$ to $\frac{1}{16}$ in.

"Chanic" state that mills of small or of very large capacity are also asked for, but that the market for them is very much smaller.

The mill in which they are usually interested has the following accessories: grinding chamber with reversible hammers fixed or not, a shaft mounted in completely enclosed ball bearings, sieves gauge $\frac{3}{32}$ in., $\frac{1}{16}$ in., and $\frac{1}{32}$ in., a powerful fan on ball bearings, and outlet tubes ending in a cyclone with an arrangement for bagging.

Manufacturers interested in this enquiry should write direct to "Chanic," forwarding information about their plant including weight, cubic measurements, etc., together with trade literature and prices (pro forma invoice) and cost of transport from factory to the port of shipment, etc. They would also like to know how much percentage reduction on the price of this material it would be possible to grant them.

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Recovered and Residue Oils

Otto Asbach and Co., Chilehaus B, Hamburg 1, wish to contact United Kingdom exporters of recovered and residue oils (vegetable and animal) and of off-fats.

Firms interested in this enquiry are asked to write direct to the Hamburg firm, giving details of prices, deliveries, and terms.

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Packaged Food Specialities

Mr. Robert E. Gould of Herman Hollander, Inc., 154, Nassau Street, New York 38, has intimated that his company would be interested in importing packaged food specialities from the United Kingdom.

The only food products at present handled by the company are coffee, imported from Africa, and tunny fish from Japan, and the company is now prepared to investigate the possibilities of handling any suitably packaged and priced article, in particular biscuits, jams, and jellies. The company would import either on their own account, on consignment, or on a commission basis, depending on what arrangements could be made with firms who were prepared to supply.

Manufacturers interested in this enquiry should write to Mr. Gould, by air mail, giving details of their products and quoting prices in U.S. dollars, c.i.f.

Fish for U.S.A.

Mr. Robert Burge, trading as Howard T. Burge Company of 1709, West 8th Street, Los Angeles, California, would like to receive quotations from United Kingdom curers or packers of smoked cod fillets, napeless finnon haddocks, and large headless cured kippers.

It is likely that frozen boneless fillets of cod, lemon and Dover soles, and halibut fillets would also be of interest.

Firms interested in this enquiry should communicate with Mr. Robert Burge by air mail, giving full details of the products offered. Prices should be quoted in U.S. dollars, c.i.f. U.S. port.

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Peanut Butter and Shelled Peanuts

W. H. Schwartz and Sons Ltd., of Halifax, Nova Scotia, would like to be put in touch with United Kingdom manufacturers of:

(*a*) Two-pound metal pails for packing peanut butter.

(*b*) Equipment for the cooking and salting of shelled peanuts.

The peanut butter pails should be decorative, with tight fitting lids, and should be made in such a way as to avoid any seepage of oil through the seams. The pails, identical to samples which can be inspected in Room 816 of the Export Services Branch of the Board of Trade, are required in lots of 100,000, packed 12 to a printed corrugated reshipping carton.

Manufacturers responding to this enquiry should write by air mail direct to the company, giving full details of the products offered. Prices should be quoted in Canadian dollars c.i.f. Halifax and Montreal. In the case of the peanut butter pails the prices should be quoted for lots of 100,000.

■

Milk Suitable for Children

A. J. Haiek y Hermanos, of Apartado 86, Caracas, Venezuela, would like to obtain an agency for United Kingdom manufacturers of milk suitable for children. The types specified are skimmed, full cream, acidified, dextro-malt, etc.

Details of the Venezuelan Foodstuffs Regulations may be obtained on application to the Tariff Section of the Export Services Branch of the Board of Trade.

Manufacturers interested in this enquiry should write direct to the firm giving full details of their products and quoting c.i.f. prices in U.S. dollars.

■

Scotch Whisky

Rene Esnault of Etablissements Rene Esnault, 13, rue Nicolas Mayeur, Tsaralalana, Tananarive, Madagascar, wine merchants, wishes to obtain the exclusive agency for a good Scotch whisky.

Firms interested in this enquiry should write direct to M. Rene Esnault giving details of their offers.

■

Confectionery for U.S.A.

The Gardner Importing Co., P.O. Box 14203, Houston, Texas, would like to hear from United Kingdom firms who can supply confectionery to them direct. They are particularly interested in plain liquorice candy, assorted liquorice candy packed in 8 oz. cardboard boxes, and hard fruit drops packed in 8 oz. tins or glass jars.

The U.S. firm have stressed that they wish to deal with United Kingdom firms direct.

News from the Ministries

Canned Salmon and Crab

From October 1, 1954, all controls over prices and distribution for canned salmon and canned crab will be abolished. Private imports will be resumed from the same date and details of the import licensing arrangements have been published by the Board of Trade.

The remaining stocks held by the Ministry of Food are expected to be distributed to the trade in September; this will be the last allocation under control.

The Imported Canned Fish (Maximum Prices) Order, as amended, has been revoked with effect from October 1, 1954.

Scottish Milk Regulations

Changes in the law governing the production and supply of milk in Scotland come into force on October 1.

From that date, bottles of pasteurised milk will have to be fitted with caps which seal the lip of the bottle. This already applies to other "special designation" milks.

Bottling of pasteurised milk will have to be done on the premises where pasteurising takes place. This is to prevent its being handled after it has been pasteurised. Retailers who now buy pasteurised milk in bulk and bottle it for delivery to customers will need to order bottled pasteurised milk from their suppliers.

The special designation "Standard" will not be recognised after September 30. In "specified areas," which include all cities and large burghs and many small burghs and landward areas, the sale by retail of Standard milk will be forbidden. The only grades of milk allowed to be sold in these areas will be Certified, Tuberculin Tested, Pasteurised, and Sterilised.

In all other areas dairy farmers who by October 1 have not raised the quality of their herd from Standard to Tuberculin Tested will not be paid a quality premium.

A producer's licence to use the special designations Certified or Tuberculin Tested will be granted from October 1 only if the herd from which the milk comes is attested or is in a tuberculosis eradication area of the Ministry of Agriculture and Fisheries. The effect of this is that Certified and Tuberculin Tested milk will in future come from farms where all the cattle, and not only the milk cattle, are certified to be free from bovine tuberculosis.

Imported Meat

The attention of importers and traders dealing in imported meat is drawn to the Merchandise Marks (Imported Goods) No. 7 Order, 1934, as amended by the Merchandise Marks (Imported Goods) Amendment Order, 1936, which requires certain classes of imported meat to bear an indication of origin.

It is essential that the requirements of the Order should be carefully observed, otherwise meat is liable to be refused admittance into the United Kingdom.

Notice No. 33C summarising the provisions of Marking Orders relating to imported foodstuffs, including the Order relating to meat, can be obtained free from the Ministry of Agriculture and Fisheries, Fertilisers, Seeds, and Hill Farming Division, 3, Whitehall Place, S.W.1.

Lard, Animal Fats, Oils, and Greases

The following arrangements have been made for the import of lard and certain animal fats, oils, and greases from August 1, 1954.

Imports of lard from the sterling area will be allowed under Open General Licence, *i.e.* without the need to obtain separate licences. Imports from non-sterling non-dollar sources will be admissible under specific import licences. A limited quantity will be admitted from the U.S.A. under the provisions of the Mutual Security Act.

Imports of animal (excluding marine animal) oils, fats, and greases other than butter, lard, premier jus, oleo stock, and unrendered pig fats, will be admitted from non-dollar countries under Open General Licence.

Canned Tomatoes

Canned tomatoes can now be imported from Western Europe and certain other countries, except the dollar area and Eastern Europe, without restriction. Hitherto they have been on quota.

Information and Advice

This Service is available to subscribers to FOOD MANUFACTURE. If a stamped addressed envelope is enclosed replies will be sent by post, but enquiries cannot be answered by telephone.

Sage and Onion Stuffing

B.7179. *We require a formula for the manufacture of sage and onion stuffing as sold in packets.* (Glam.)

The following will form a basis for experiment:

Fine white rusk	10 lb.
Peeled onion	4 ,,
Finely rubbed sage	2 ,,
Dairy salt	8 oz.

The onion is sliced and dried thoroughly prior to mixing with the other ingredients. It is possible to purchase kibbled onion ready prepared which obviates the drying procedure. Dried onion powder might also be used.

Roll Mops

B.7180. *We are interested in the preparation of roll mops and should be glad of any information you have available.* (Cornwall)

The following directions are recommended for the preparation of roll mops from well-cured salt herring of medium size and good quality:

Salt herring	10 lb.
Distilled vinegar (5 per cent. acidity)	2 qt.
Dill pickles (medium size)	8
Chopped onions	4 oz.
Sugar	2½ ,,
Whole cloves	1 ,,
Mustard seed	1 ,,
Chili peppers	1 ,,
Bay leaves	1 ,,
Whole black pepper	1 ,,
Whole white pepper	1 ,,
Whole allspice	1 ,,
Powdered nutmeg	⅛ ,,
Cracked cinnamon	⅛ ,,
Cracked ginger	⅛ ,,
Crushed cardamom	⅛ ,,

The bay leaves and chili peppers are put in a small cloth bag, so that they can be easily separated for later use, and placed, together with the balance of the spices and three-quarters of a quart of vinegar, into a covered receptacle. This is brought to the boil and allowed to simmer for one and a half to two hours. Violent boiling causes loss of the volatile acetic acid. A simple way is to put the spices in a common fruit jar and place in boiling water for two hours. This is allowed to stand for one to two weeks after boiling to ensure still greater extraction of the spicing materials.

The chili peppers and bay leaves, which are to be used for decorative purposes, are removed and the pickle is strained through a cloth bag to remove the spices. These should be well mixed ready for adding to the jars before packing.

To prepare the fish, the heads are first removed and then scaled and washed. The fish is then split into two fillets and trimmed, freshened for two and a half hours in running water, and then drained. Ten lb. of medium sized herring should give about 6 lb. drained weight.

The fillets are packed skin down in a stone crock (a two gallon size answers the purpose nicely), and then covered with one and a quarter quarts of vinegar. If necessary, a light weight can be placed on top to keep the fillets well covered. Curing in a cool place should take 40 to 48 hours. The fish are then removed and drained. The vinegar should now test about 2 per cent. acid and show a salinometer reading of about 30°. The fish has absorbed much of the acid and has lost some salt.

Each dill pickle is cut lengthwise into four parts, then across the centre, making eight pieces in all. The fillets are rolled around a piece of pickle and fastened with a fresh clove. A clove serves the purpose just as well as a toothpick and adds to the attractiveness of the pack. One teaspoonful of mixed used spices is placed on the bottom of the jar, and the fish is then packed.

With medium sized herring, three rolls will pack nicely into a jar (with a capacity of six fluid ounces) if placed on end. The sides are decorated with a couple of chili peppers and a bay leaf, and sufficient pickle is added to fill. The net weight should be five and a half ounces or over. The jars should be sealed immediately after packing, vacuum sealing being preferable.

Cold storage at about 35°F. is advisable to ensure longest preservation.

Thick Sauce

B.7181. *Could you please let us have a formula for a thick sauce?* (Herts.)

The following formula is given as a basis for trial:

Malt vinegar (5½ per cent.)	30 gal.
Ginger syrup	20 ,,
Chopped raw onion	50 lb.
Tomato purée (triple conc.)	10 gal.
Apple pulp	50 lb.
Dates	100 ,,
Foots sugar	60 ,,
Lime juice	1 gal.
Shallots	10 lb.
Chopped garlic	10 ,,
Anchovies *ex* brine	10 ,,
Orange marmalade	50 ,,
Salt	5 ,,
Cayenne	4 oz.
Cloves	4 ,,
Mace	4 ,,
Coriander	4 ,,
Cardamom	2 ,,

The ingredients are simmered for two hours. Then 6 lb. of gum tragacanth in 10 gal. of vinegar and 15 lb. of wheat flour in 5 gal. of vinegar are added. The whole is heated again until the starch has thickened. Finally, 1 oz. of oil of thyme, ½ oz. of oil of marjoram, and ½ oz. of oil of bay are added and sieved.

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.7134. *Synthetic cream.* (Ireland)

B.7135. *Rose hip syrup.* (Scotland)

B.7136. *Confectionery packaging machinery and weighing equipment.* (U.S.A.)

B.7137. *Packaging of flour.* (Lancs.)

B.7139. *Roasted and salted nuts.* (Lancs.)

B.7142. *Flavours.* (Lancs.)

B.7143. *Fish processing plant.* (London)

Information Required

B.7150. *Manufacturers of machinery to cut 56 lb. rolls of Cheddar cheese into slices ½ in. to 1 in. in thickness and to cut 56 lb. rolls or slices as above into ½ in. to 1 in. cubes, both with a capacity of one to two tons per hour.* (Ireland)

Recent Patents

713,069. A.P.V. Co., Ltd.: Preparation of worts.

713,106. Rose Bros. (Gainsborough), Ltd.: Sweet forming and wrapping machines.

713,136. Stuve, W. J.: Process for freshening stale bread.

713,161. Wilkinson Processes (High Frequency), Ltd.: Process and apparatus for the pasteurisation of milk.

713,181. Autopack, Ltd., Smith, A. R., Lee, G. A., and Hopkins, C. J.: Automatic weighing machines.

713,210. Jones, T. M.: Blanchers or pre-cookers for peas or beans.

713,281. Mapes Consolidated Manufacturing Co.: Egg packing material.

713,617. Allied Bakeries, Ltd.: Mechanical moulding of dough pieces in breadmaking.

713,640. Vonarburg, A.: Insulating boxes, particularly for keeping ice cream cool.

713,683. Creamery Package Manufacturing Co., Ltd.: Plate-type heat exchangers.

713,888. Raudszus, O. (trading as Ultrakustgeraetebau Dr. Ing. O. Raudszus): Process in or for the production of beer using sonic frequency vibrations.

713,965. Jessop and Co., Ltd.: Apparatus for the handling of grain and other granular, pulverulent, and fluent solid materials.

714,058. Templeton, R. A. S.: Edible powders and methods of making same.

714,119. Vosseler, O.: Process for the production of a fermentation beverage.

714,133. Kaden, O. F.: Method of working up cocoa beans into cocoa paste or powder.

714,142. Paper Sacks, Ltd., Rawlins, J. D., and George, P. K.: Multiple valved paper sacks.

714,176. Packman, P. J.: Apparatus for separating foreign bodies from root crops.

714,198. Lanz Akt.-Ges., H.: Beet-topping devices.

714,221. Dekkers, P. M. C., and Siebols, P.: Apparatus for sterilising or pasteurising foodstuffs, especially milk.

714,257. Hodgins, R. D. Scoble-: Apparatus for sorting and sizing apples, oranges, tomatoes, peaches, or other suitable articles.

ABSTRACTS OF BRITISH PATENTS

Ice Cream Freezer

In the hitherto known ice cream freezers, drive is effected either from below through an aperture at the base of the can or from above which involves the arrangement of parts relatively movable to each other above the opening of the can. It is quite obvious that with cans having an aperture in the base it is impossible to avoid contaminating the ice cream. The same is true when the drive is above the can because in this case it is possible that lubricating oil will fall into the ice cream.

The freezer comprises an ice cream container, a refrigerating device surrounding it, an agitating paddle within the container, a drive mechanism for effecting a relative rotary movement between the container and the agitating paddle and also for effecting a separate movement of the agitating paddle. The drive mechanism is disposed outside the container and below the upper opening thereof, engaging the side wall and the bottom of the container. The drive mechanism is adapted to effect a first oscillating movement of the paddle about a first axis which is substantially radial of and perpendicular to the axis of the container and a second oscillating movement of the paddle about a second axis which is in a plane substantially at right angles to the first axis and which second axis is adapted to partake in the first oscillating movement whereby the paddle is adapted to scrape the interior side wall and bottom of the container.

708,420. *Maschinenfabrik Steinau Woyth and Co.*

Potato Pulp and Starch Particles

A method is described for the separation of potato pulp into fibres on the one hand and starch particles in a liquid on the other.

The pulp is spurted through a suitably shaped nozzle along the inside of a static, perforated cylinder wall.

Apparatus in which the method can be carried out is also given.

709,890. *Matthijs Boogaard.*

Process for Colouring Foodstuffs

It has now been found that polyphase foodstuffs which contain water and a material which will form a dispersion with water (*e.g.* a fat, protein, or starch) as components can be satisfactorily coloured by colouring both the continuous and disperse phases. The present invention describes a process for the coloration of foodstuffs of the kind described, which comprises colouring both the continuous and disperse phases of the foodstuffs by adding thereto a harmless colouring material capable of colouring the continuous phase and a harmless colouring material which is capable of colouring the disperse phase.

Margarine, butter, processed cheese, puddings, and ice cream, which contain fat, starch, or protein as one component, are suitable foodstuffs for colouring by this process.

710,789. *Deutsche Hoffman-La Roche Aktiengesellschaft.*

The Manufacture of Glucose

A process for the manufacture of glucose is described in which starchy materials are converted in an acid aqueous medium and under steam pressure into liquors containing a high percentage of reducing sugars. The converted liquors are neutralised, filtered, decolorised, refined, and concentrated, a fraction of the heavy concentrated liquors thus obtained being subjected to a dynamic crystallisation. The free glucose crystals are separated from the primary massecuite and the first greens thus obtained are percolated through base-removing substances regenerated with regenerants, such as mineral acids, imparting H ions. The first greens thus treated, in which the mineral salts have been changed to acids, are mixed with fresh starchy materials, prior to their conversion characterised in that the fraction of the heavy liquors, having not been subjected to a dynamic crystallisation, is crystallised statically, in order to produce hard slab sugar blocks, in which the uncrystallisable part of the fraction, which has been statically crystallised, is confined in the mass of glucose crystals formed by the static crystallisation.

711,803. *Société Anonyme Holding Luxembourgeoise "Inventa."*

Apparatus for Baking Wafers

This invention relates to apparatus for baking wafers and the like, of the kind in which the oven is a baking zone formed between an endless travelling cover band and the grooved surface of a rotating drum in part encircled by the band and in which dough fed to the band is carried into the baking zone by the band and formed into wafers or the like by suitable patterning on the band or drum or both. The drum or band or both are so heated and the speed of rotation of the drum so adjusted that the dough is completely cooked by the time it reaches the point where the band leaves the drum.

711,869. *Karl Thiele.*

Pumping Units

A pump suitable for conveying liquid foods and beverages, pharmaceutical and chemical liquids, and the like is described. It comprises a centrifugal pump and an electric driving motor disposed co-axially with the pump.

By means of a switching element disposed co-axially with the shaft, the suction channel and the pressure channel can be brought into connexion alternately with the inlet and discharge openings in the housing, without considerable deflections of the delivery liquid. A rotary valve may be disposed in suitable manner between the two pump members for controlling the switching and/or regulation thereof, and is preferably of such construction that not only is a parallel connexion and a series connexion possible alternately, but also different cross-sectional areas for the passage of liquid can be obtained.

710,283. *Philipp Berdelle-Hilge.*

ABSTRACTS OF FOREIGN PATENTS

Heat Sealing Apparatus

Apparatus for heat sealing thermoplastic sheet wrapping material round a package is described.

Canadian 499,285. *H. Rumsey.*

Plastic Sheets

Thin sheets of plastic material, such as cellulose acetate, with a network of lines on the surface, are used for packaging.

French 1,022,147. *C. Nicolle.*

Magnetic Support for Can Bodies

In the can body side seam soldering machine described, the can bodies are magnetically suspended by overhead magnets, but they are spaced from the supporting magnets by adjustable non-magnetic tracks along which they slide as they advance through the machine.

U.S. 2,660,969. *American Can Co., C. S. Woolford, and J. E. Socke.*

British patents and trade marks have been selected from the "Official Journal of Patents" and the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

Trade Marks

ALUTCO.—679,062. Rice, rice meal, ground rice, and rice bran, all for food for human use. **Alfred Lüthke,** trading as **A. Lüthke and Company,** Möckerbergstrasse, 17, Hamburg, Germany; Import and Export Merchant.

HELDER'S.—698,251. Biscuits (other than biscuits for animals). **N. V. Zwolsche Biscuitsfabriek Voorheen, E. Helder and Company** (a Limited Liability Company organised and existing under the laws of the Kingdom of the Netherlands), Hoogstraat, 19-21, Zwolle, Holland; Manufacturers and Merchants.

CHERRYBURL. — 712,171. Machines for filling, capping, and washing bottles, cans, and the like containers; mixing machines; conveyors (machines); pumps; churns (machines); machines for feeding fruit, nuts, or confections into ice cream freezers; homogenising apparatus and installations; evaporators being machines; drying machines; emulsifying machines; separating machines, machines for kneading and extruding butter; machines for cutting and wrapping butter; and mechanically operated processing tanks and vats. **Cherry-Burrell Corporation** (a Corporation organised and existing under the laws of the State of Delaware, United States of America), 427, West Randolph Street, City of Chicago, State of Illinois, United States of America; Manufacturers.

ROCKET.—718,301. Ice making machines, ice safes, and evaporating apparatus. **Antonie Förster, Brigitte Kusnetsow-Langewitz,** and **Frederica Fechner,** trading as **F. W. Fechner and Company,** Juthornstrasse, 92, Hamburg-Wandsbek, Germany; Manufacturers.

KINEPACK.—726,370. Chocolates, non-medicated confectionery, biscuits (other than biscuits for animals), ice cream, ice cream powder, water ices, and syrups for making water ices. **E. N. Adsetts and Son, Limited,** 4-14, Ridgeway Road, Intake, Sheffield, 12; Manufacturers and Merchants.

TANTALUS.—726,395. Meat, meat products (for food); fish, poultry, and game (other than live fish, live poultry, and live game); fish products, poultry products, and game products (all for food); preserved, dried, cooked, bottled, and canned fruits and vegetables; dairy products (for food); and jams and marmalade, but not including meat extracts or milk. **Anson and Lee (Food Supplies), Limited,** 44, Fish Street Hill, London, E.C.3; Merchants.

SOLUSAC.—726,396. Artificial sweetening substances. **Harrogate Pharmaceuticals, Limited,** Golden Mile Works, Bridgend, Glamorganshire; Manufacturing Chemists.

RILCAR.—726,442. Milk and dairy products (for food). **O. W. Carter and Company, Limited,** 84, Brook Street, London, W.1; Merchants.

SAFARI.—726,714. Canned meats. **J. Morey et Fils Société Anonyme** (a Société Anonyme organised under the laws of France), Cuiseaux, Saone et Loire, France; Manufacturers and Merchants.

BREDEX.—726,788. Edible oils and fats. **The British Margarine Company, Limited,** Central House, 46-47, Finsbury Square, London, E.C.2; Manufacturers.

PALIOL.—726,843. Edible oils and fats. **A. Goldrei and Company, Limited,** Tabard House, 116, Southwark Street, London, S.E.1; Manufacturers and Importers.

SILVER PRIDE.—726,856. Sardines. **John Martin of London, Limited,** 14, Seething Lane, London, E.C.3; Manufacturers and Merchants.

ROSEBUSH.—726,992. Canned meats, canned fruits, canned fish; and butter, edible lard, and cooking fat. **A. J. Mills and Company, Limited,** Colonial House, Tooley Street, London, S.E.1; Merchants.

PLASWRAP.—727,075. Machines for use in the manufacture of confectionery and foodstuffs and for the wrapping and packing thereof, and parts of such machines. **The Forgrove Machinery Company, Limited,** Dewsbury Road, Leeds, 11, Yorkshire; Manufacturers of Wrapping Machinery.

GOLDEN GLEAM.—727,159. Margarine. **Western Margarine, Limited,** Westfields Road, Acton, London, W.3; Manufacturers.

SNOWCAP. — 727,952. Frozen fish. **Eldorado Ice Cream Company, Limited,** 14, West Smithfield, London, E.C.1; Manufacturers.

MOOKAAP.—728,175. Milk drinks (non-alcoholic) containing fruit juices or fruit flavourings. **O. R. Groves, Limited,** 32, Shaftesbury Avenue, London, W.1; Merchants and Manufacturers.

HOGMASTER.—728,197. Machines for de-hairing pigs and parts of such machines. **Boats Fittings Company, Limited,** 250, Coronation Road, Bristol, 3; Manufacturers.

ELFREDOS.—728,285. Canned fish. **Mark Lane Milling Company, Limited,** 196, Tower Bridge Road, London, S.E.1; Manufacturers and Merchants.

BURGEE.—728,287. Fish cakes. **H. Mudd and Son, Limited,** North Quay, Grimsby, Lincolnshire; Merchants and Manufacturers.

New Companies

Byprofood, Limited. (533575.) 3a, Museum Street, Ipswich. To take over business of manufacturers of feeding-stuffs and processors of by-products carried on at Uplands, Clopton, Woodbridge, by L. G. B. Clark and W. G. B. Clark. Nom. cap.: £2,000 in £1 shares. Dirs.: L. G. B. Clark, The Anchorage, Iken, Woodbridge, Suffolk, and W. G. B. Clark, Uplands, Clopton, Woodbridge, Suffolk.

Dane Valley Food Products, Limited. (533777.) Park Street, Congleton, Cheshire. To take over business of confectionery and potato crisp manufacturers carried on at Congleton as "Dane Valley Products." Nom. cap.: £100 in £1 shares. Dirs.: R. A. Cope and Mrs. J. R. Cope, Whitecroft, Mellor, Nr. Blackburn.

Peters (Leeds), Limited. (533797.) 63, Raglan Road, Leeds. To carry on business of confectioners, manufacturers, wholesalers, and retailers of sugar and other cake decorations and sugar novelties. Nom. cap.: £100 in £1 shares. Dirs.: J. Husbands and Mrs. D. Husbands, 41, Wynford Terrace, Leeds.

P. H. Baker (Food), Limited. (533798.) 34, Castle Street, Liverpool. To carry on business of manufacturers, preservers, and canners of and dealers in fish, meats, poultry, game, groceries, and confectionery. Nom. cap.: £1,500 in £1 shares. Dirs.: P. H. Baker and B. H. Baker, Gayton Hall, Heswall, Cheshire.

Page, Hoare and Company, Limited. (533987.) 4, Beach Road, Littlehampton. To carry on business of manufacturers of and dealers in food and foodstuffs. Nom. cap.: £500 in £1 shares. Dirs.: K. E. P. Hoare, 4, Elm Drive, Elmer Sands, Sussex; P. V. Page, 53, St. Catherine's Road, Winchester; H. M. Page, and J. F. Page.

Pewsey Milk Products, Limited. (533988.) Nom. cap.: £100 in £1 shares. Dirs.: Rt. Hon. Viscount Hudson, C.H., 26, St. Leonards Terrace, London, S.W.3; Hon. Robt. W. Hudson, Dove's Farm, Ham, Wilts., and H. C. Hingston, Norfolk House, Embankment, London, W.C.2.

Holbrooks, Limited. (534057.) To carry on the business of brewers, distillers, and manufacturers of and dealers in vinegar, sauces, and pickles. Nom. cap.: £100 in £1 shares. Dirs.: to be appointed by subs. Subs.: Barbara E. Grove-White and Marion Beadle (clks.), 6, Austin Friars, London, E.C.2.

G. Coletta and Sons (Established 1898), Limited. (534019.) 20a, Willow Walk, Tottenham, London, N.15. To carry on the business of manufacturers of and dealers in foods, ice cream, and drinks. Nom. cap.: £100 in £1 shares. Permt. dirs.: A. R. Coletta, 118, Osidge Lane, London, N.14, and E. A. Coletta, 14, Park Road, London, N.15.

Express Mercantile Agency (London), Limited. (534097.) Triumph House, 189, Regent Street, London, W.1. To carry on the business of manufacturers, importers, and exporters of food and provisions. Nom. cap.: £1,000 in £1 shares. Dir.: L. Lieberman (acct.), 189, Regent Street, London, W.1.

Grade Products (Food), Limited. (534195.) 5 and 6, Bucklersbury, London, E.C.4. To carry on business of manufacturers of and dealers in beverages, confectionery, and foodstuffs of all kinds. Nom. cap.: £2,000 in £1 shares. Dirs.: W. H. Edwards, 26, Midway Street, London, S.W.1; H. N. Edwards, and Elfreda M. Willis, 2, Essex Court, Temple, London, E.C.4, and R. G. Fowler, 52, Silwood Road, Addiscombe, Croydon.

Prepax (Nottingham) and Company, Limited. (534240.) 53 Church Street, Old Basford, Nottingham. To carry on business of manufacturers of and dealers in confectionery and other packed foods. Nom. cap.: £1,000 in £1 shares. Dirs.: L. G. Hunn, 70, Bunbury Street, Nottingham, and Mrs. L. A. Hunn, Mundford, Nr. Thetford, Norfolk.

Hygienic Food Products (Suppliers), Limited. (534396.) 2, Perseverance Terrace, Upper Mount Street, Batley. To carry on business of manufacturers of and dealers in potato crisps, shell-fish, confectionery, fruit, and other food products. Nom. cap.: £1,000 in £1 shares. Dirs.: A. Richardson, 3, Matterdale Road, Bennett Lane, Dewsbury, and R. H. Illingworth, 2, Perseverance Terrace, Upper Mount Street, Batley.

Rooth's, Limited. (534780.) 15, Burlington Street, Chesterfield. To carry on business of manufacturers of and dealers in confectionery, chocolates, sweets, ices, and cooked and prepared foods. Nom. cap.: £1,000 in £1 shares. Dirs.: Joseph W. Rooth, Rhoda E. Rooth, and John W. Rooth, all of 29, Westbrook Drive, Chesterfield.

West Country Food Supply, Limited. (534963.) 77, Wimpole Street, London, W.1. Nom. cap.: £100 in £1 shares. Dirs.: to be appointed by subs. Subs.: D. J. Quastel, 30, Eton Court, Eton Avenue, London, N.W.3, and R. Louis, 104, Upper Thames Street, London, E.C.4.

From Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.

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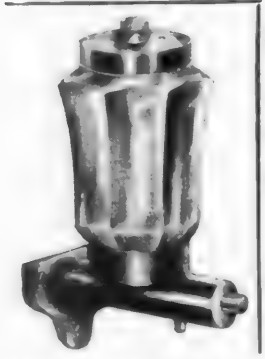

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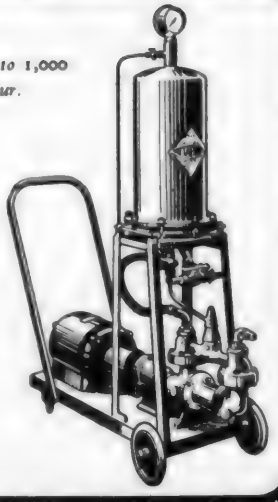

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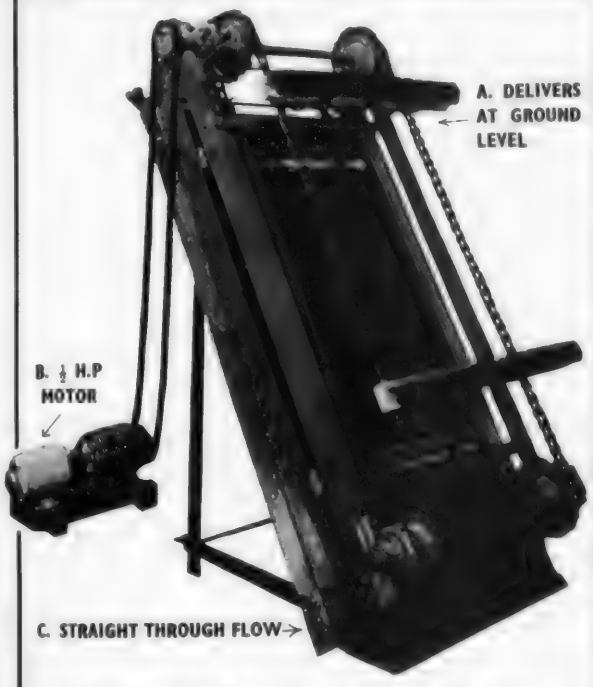

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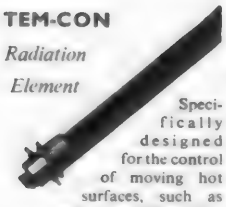

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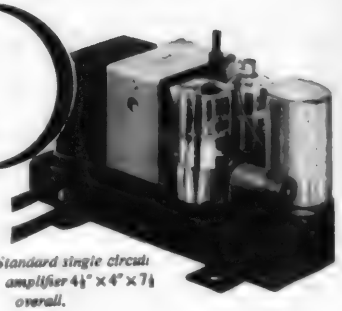

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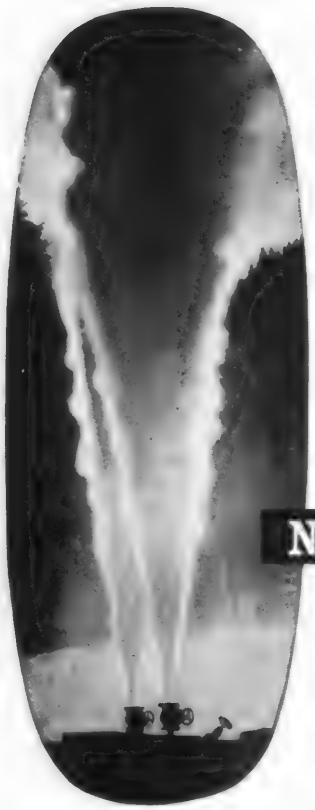

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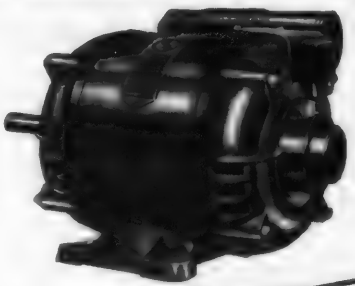

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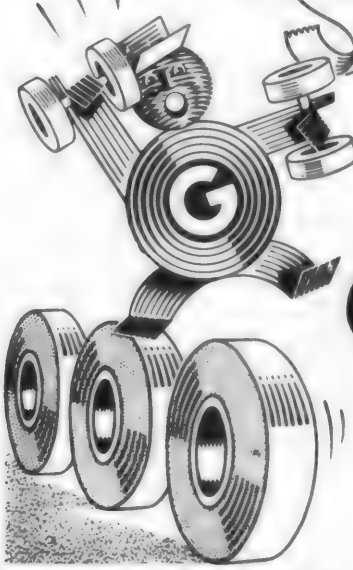

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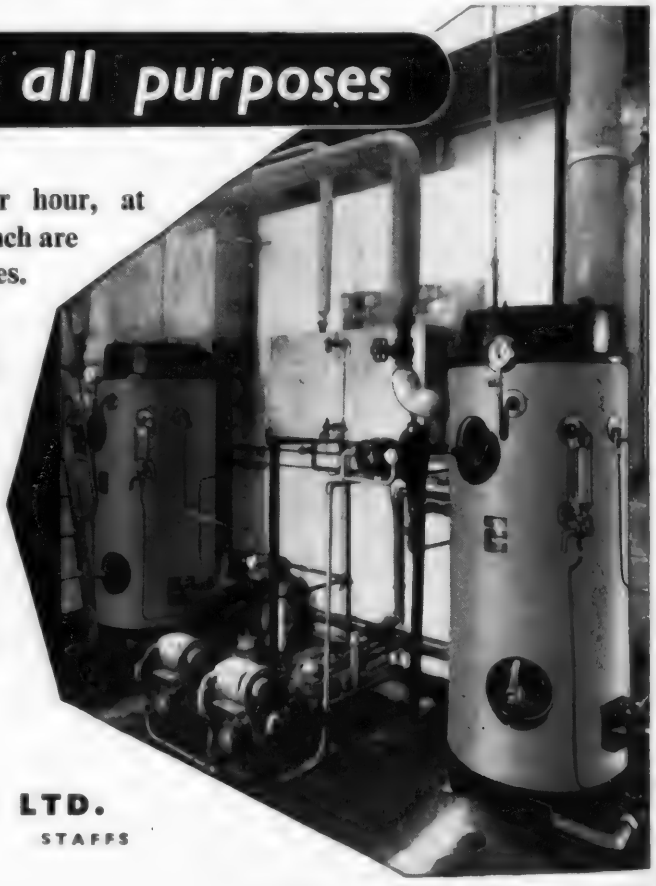

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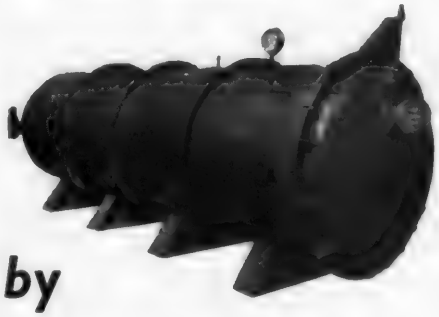

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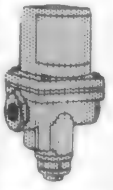

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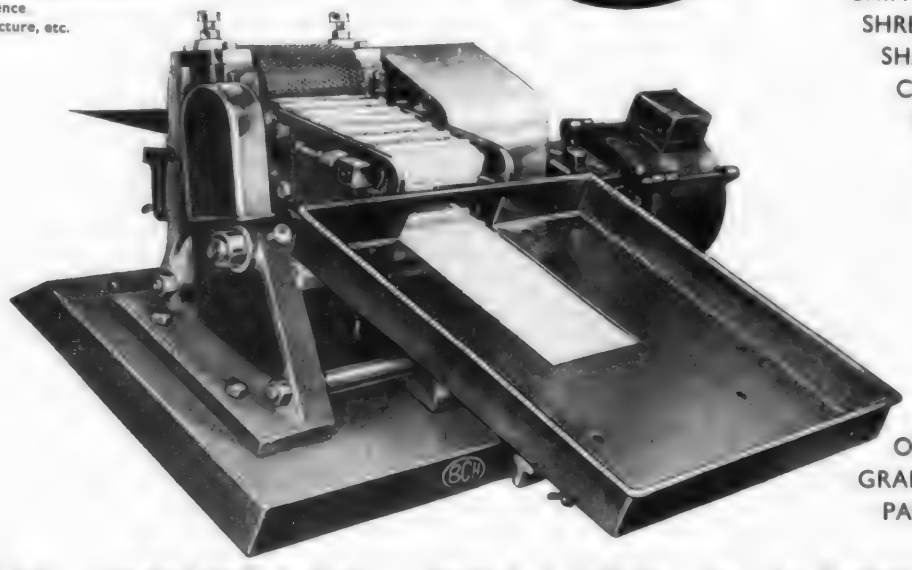

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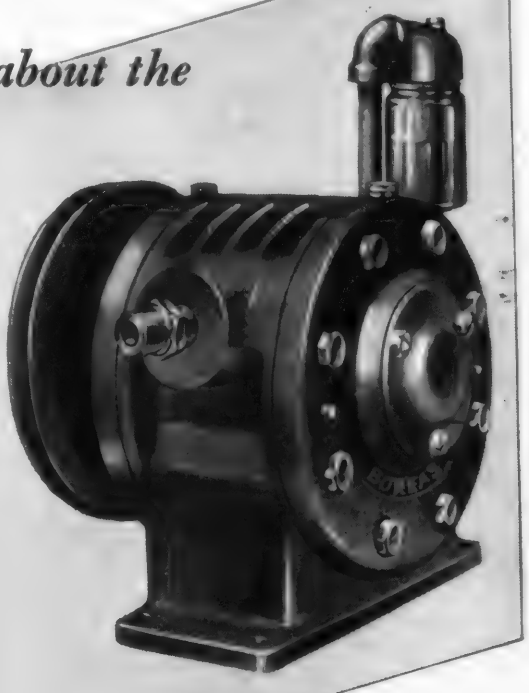

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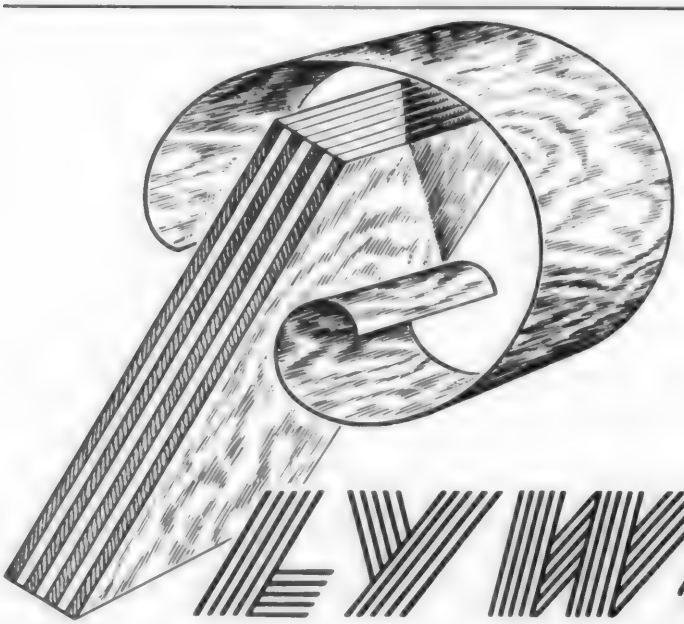

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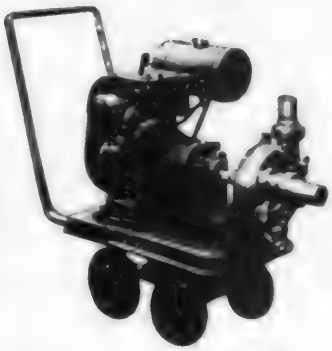

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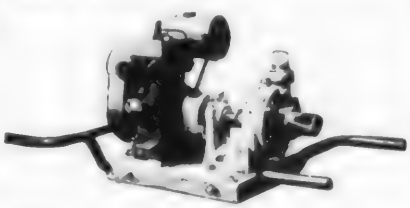

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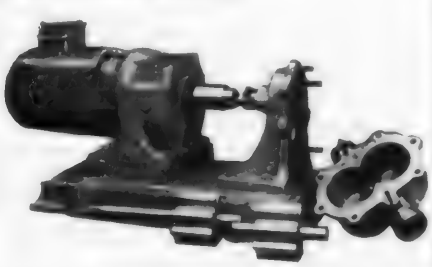
'Morton' Motor Driven Rotary Pump dismantled for cleaning.



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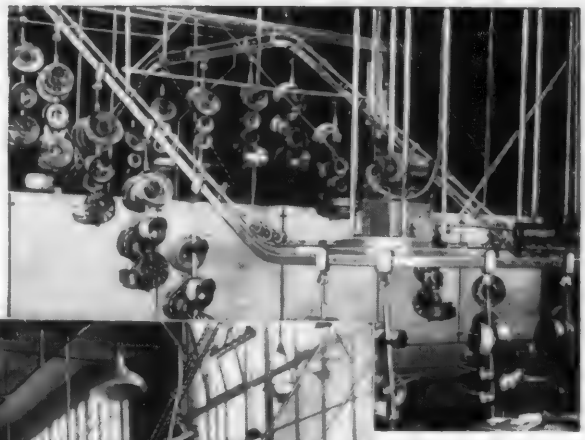
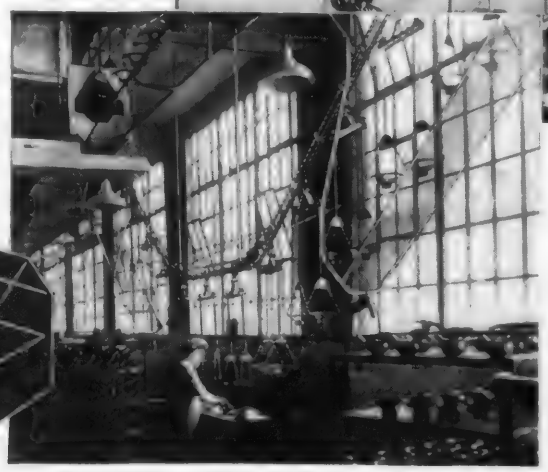
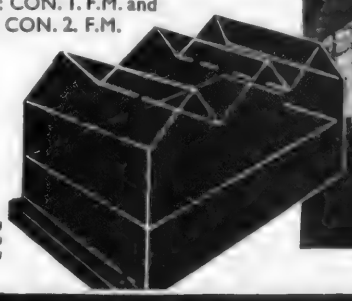


Above:
Teleflex conveyors form an important aspect of the production system of Messrs. A. C. Delco—Division of General Motors.



Left:
Teleflex conveyors are important links in the production lines at the works of the Plessey Co. Ltd., Ilford.



Right: An example of a Teleflex Conveyor which travels all round a particular factory.

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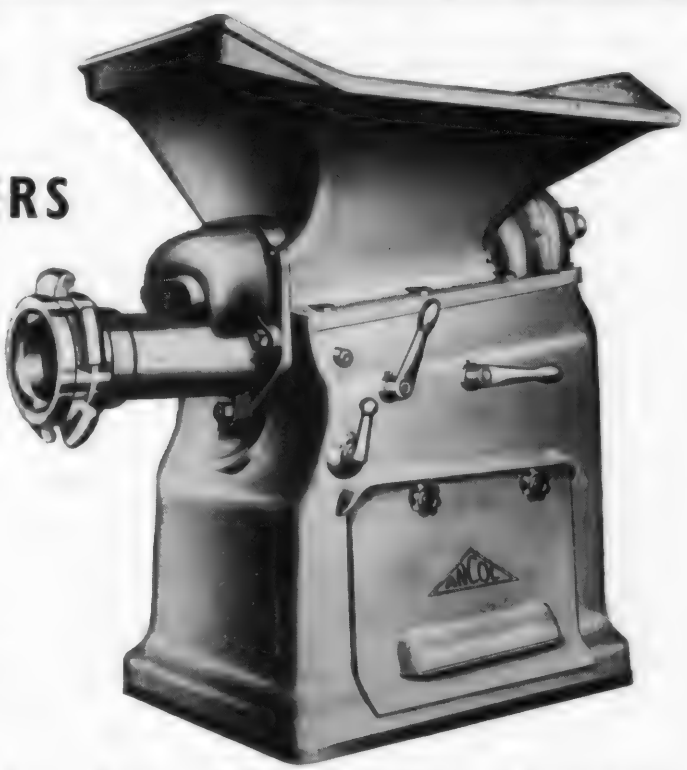

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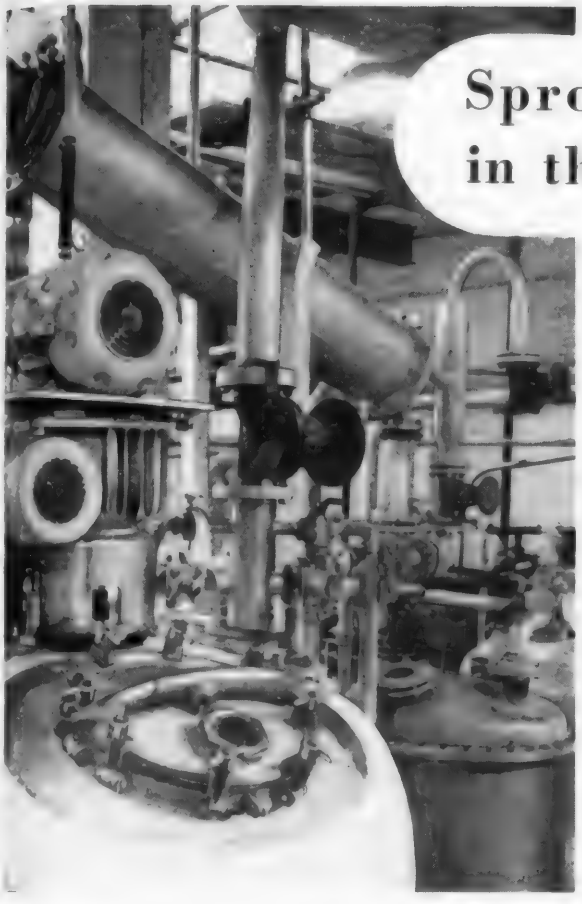
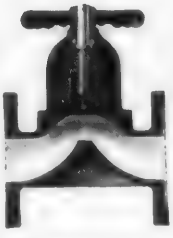


Sprouting like mushrooms in this Chloromycetin plant

Illustrating by courtesy of Messrs. Parke, Davis & Co. Ltd., a glass lined reflux still unit for the condensation of initial ingredients in the manufacture of Chloromycetin.

Installed by members of the Balfour Group of Companies this installation employs many Saunders Glass Lined Diaphragm Valves for handling the fluids involved.



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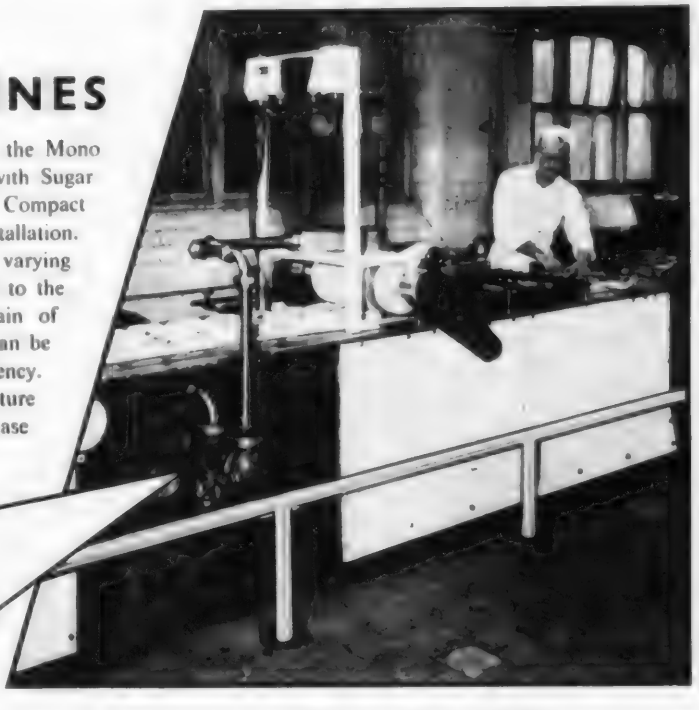

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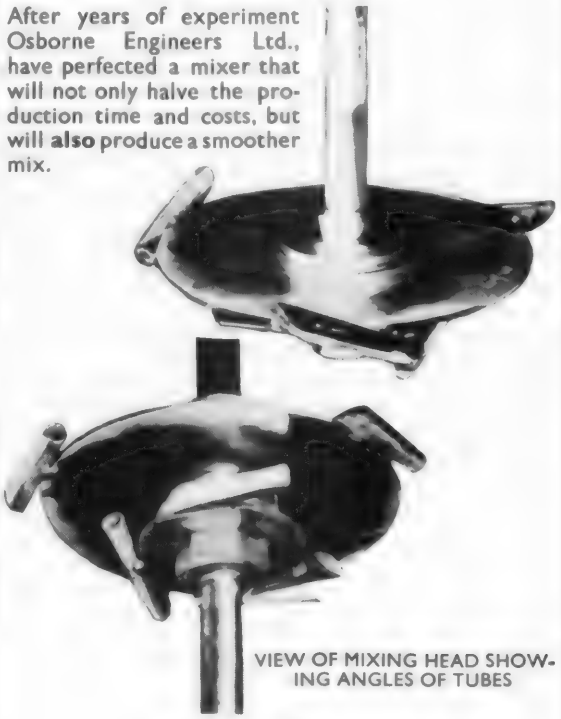
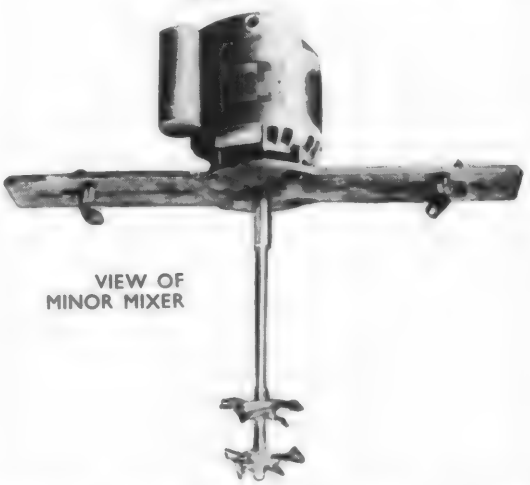


VIEW OF MIXING HEAD SHOWING ANGLES OF TUBES



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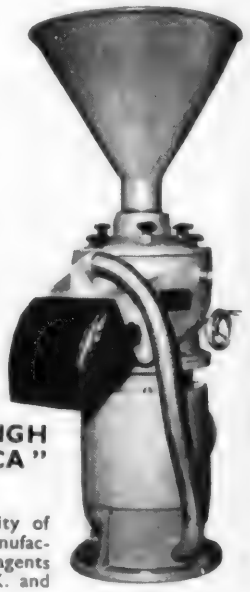

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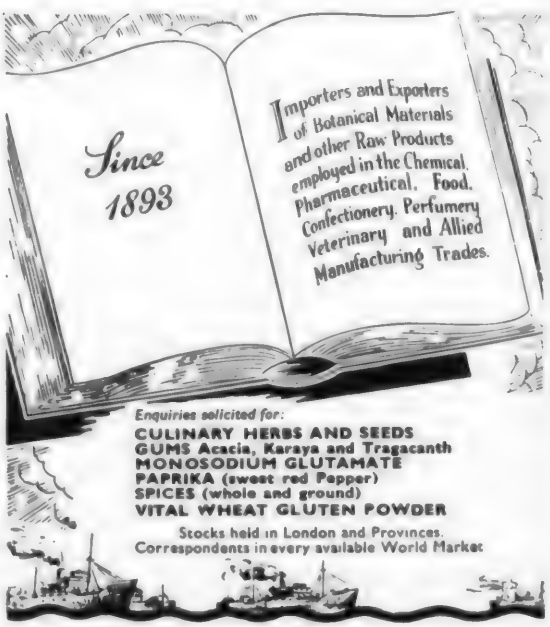
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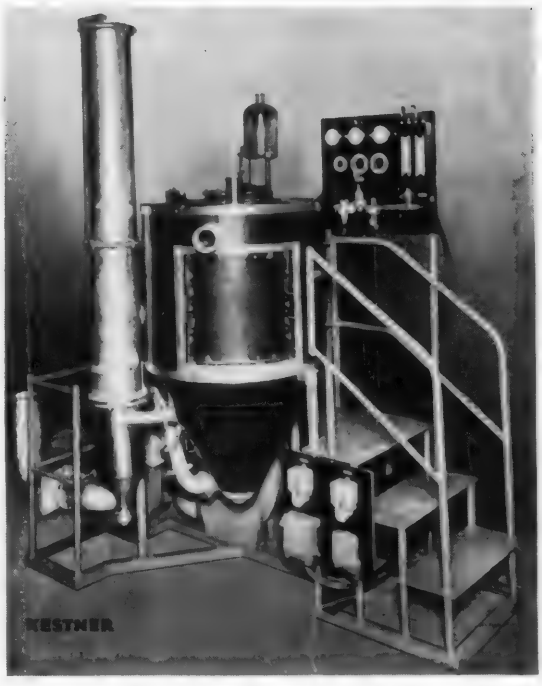

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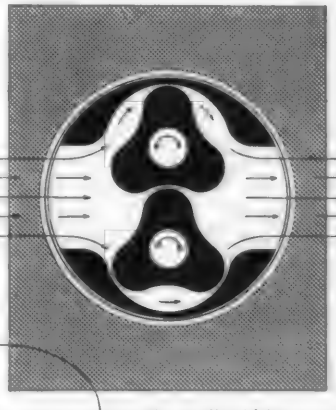

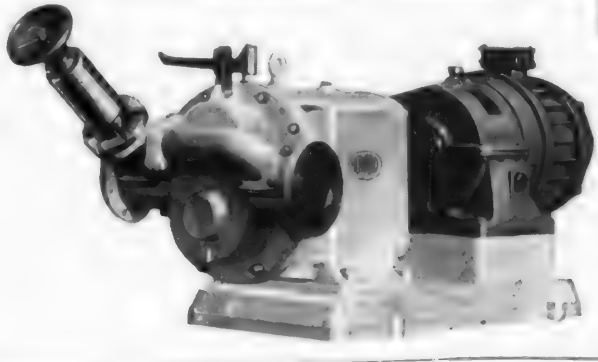

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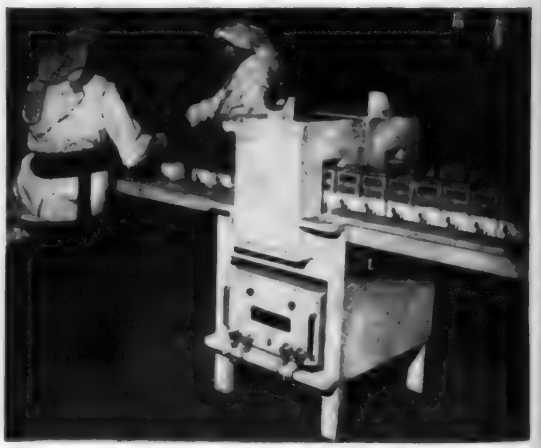

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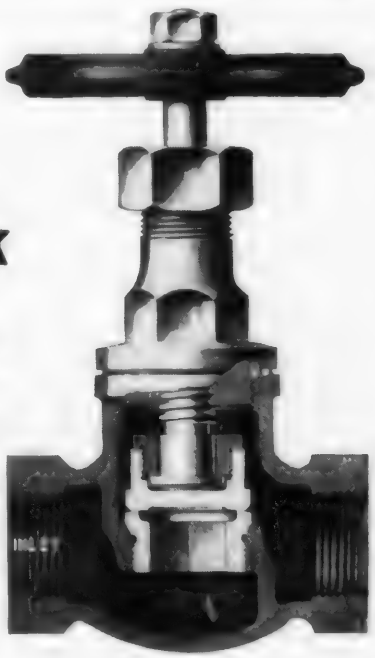

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A copy of the conditions of the sale will be sent on demand.

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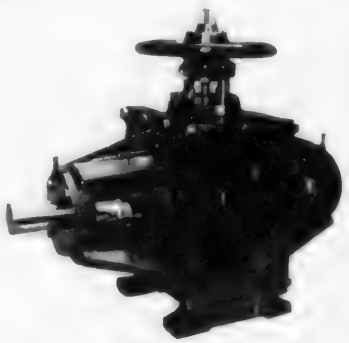

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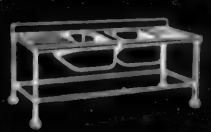

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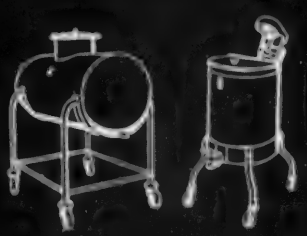
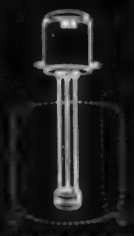


Pressurisable Vats



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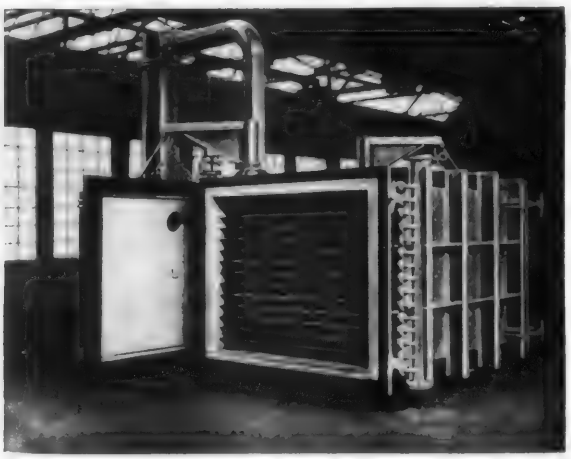

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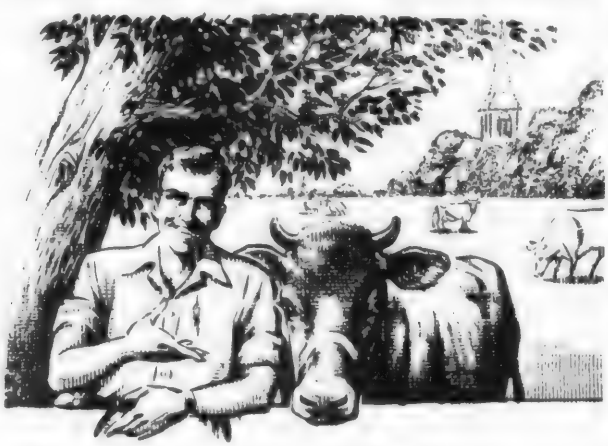

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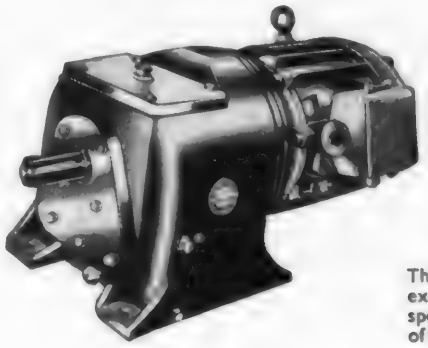

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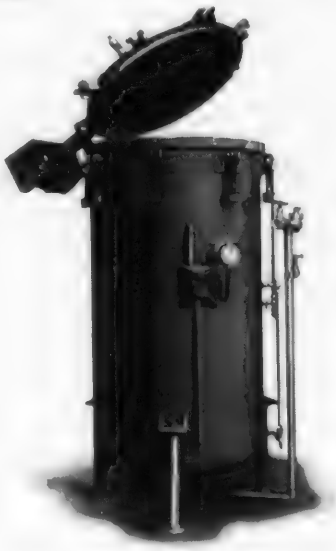

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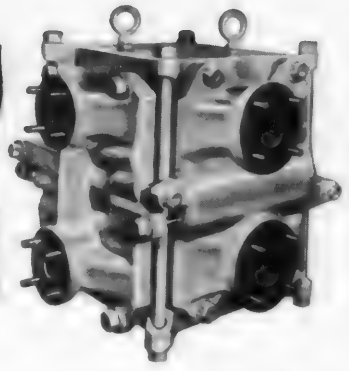

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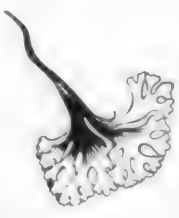

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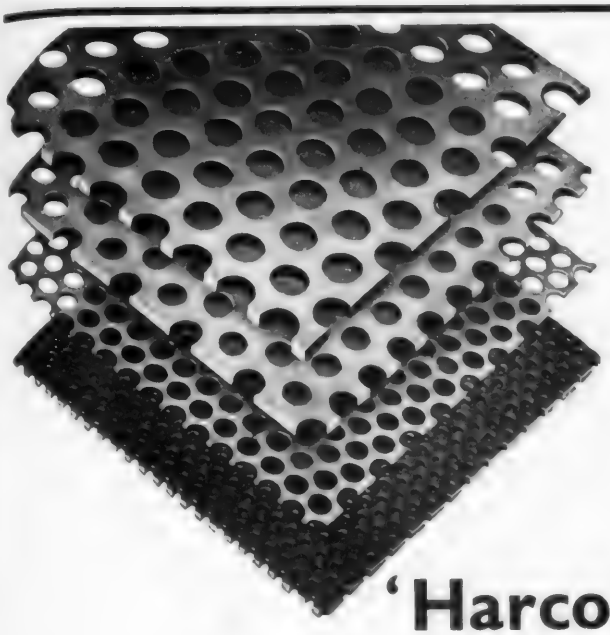

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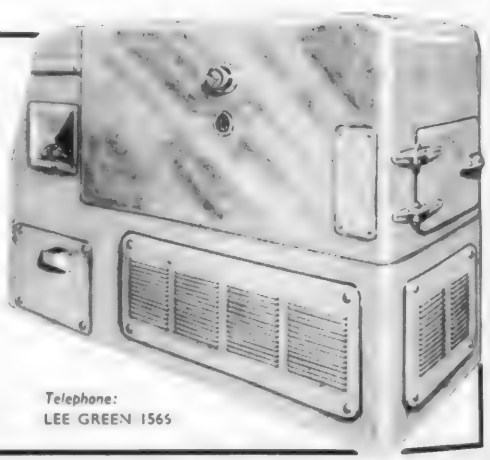

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CANNERY Stores and Plant. Beef Extract, Gelatine, Marmite, Beef Dripping, Egg Albumen, Onion Flakes, Mixed Spices, Cans, Cartons, etc. Equipment includes steam jacketed pans in copper, nickel and aluminium, retorts, mincing machine, can forming, seaming, flanging, testing and washing plant. —Write Box B4731.

WISBECH. For sale: Valuable rail-side factory premises, mainly single storey with an area of 22,000 sq. ft., erected on a leasehold site, having an area of 1.94 acres.—For further particulars apply Box B4740.

ALL varieties of Stone Fruit and Vegetables for sale on contract to Jam Makers, Preservers and Canners. We specialise in Plums, Damsons, Bramley Apples, Carrots and Swedes, delivered to your factory in our empties in 5-ton loads or over. We shall be pleased to submit our quotation on receipt of your enquiry.—Horace Sullivan Ltd., Fruit Merchants, 133, Widemarsh Street, Hereford.

STAINLESS Steel Table Tops or Trays. Factory size, 5 ft. 8 in. by 3 ft. 8 in. by 2½ in. with 1¼ in. lip all round. With or without outlet holes. These trays were originally designed for the Culturing of Penicillin and are offered as being unused. Each tray weighs ½ cwt. They have the improved inverted flute running lengthwise. Being seamless they have no crevices into which waste materials can lodge. They are reinforced on underside and treated with a rubberised solution to repel condensation. Large numbers are already in use in all branches of Food Processing. Firth's quality throughout; guaranteed "Corrosion and Acid Resisting." Price: Free packing and Carriage, £8, C.W.O.—Thos. Hogg, 31, Wellington Road, Whalley Range, Manchester 16. Tel.: MOS 3072.

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ADVERTISER purchases Waste Fats and Oils. Give full details and forward samples to L. R. Stevens, "Stella Maris," Dirtham Lane, Effingham, Surrey. Tel.: East Horsley 3229.

REQUIRED redundant Wooden Boxes, Cases, Bottle Crates and Containers in large quantities.—Full particulars price etc., to Silverdale Box Supplies Ltd., Burgess Hill, Sussex. Tel.: 3485.

MEDICAL bottles; tablet bottles; jars; bottle closures, bakelite and metal purchased. Best prices paid.—Samples and full details in first instance to Noel Davold and Co., 9, Laurence Pountney Lane, Cannon Street, London, E.C.4. Tel.: MANsion House 3951-2.

AGENTS and Wholesalers wanted to increase the sale of really first-class sugar flowers and novelties to the Bakery and Retail Trades. Generous commission and trade discount allowed.—Write in first instance giving age, experience, type of trade and area covered, also references to Box B4722.

DAMAGED or redundant stocks of food, residues or by-products in large or small quantities required.—Send your offers to Rotunda Foods Co., London Office: 50/52, Blandford Street, W.1. Tel.: Welbeck 8465.

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Phone 98 Staines

11,000 and 7,000 gall. Glass-lined Cyl. Enc. Tanks. Small Crushing Mill, 12 in. by 3 in. spiked rolls. Jacketed Vacuum Ovens, 8 ft. by 3 ft. 6 in. by 4 ft. and 5 ft. 6 in. by 2 ft. by 2 ft. 6 in. Chocolate Kettle 3 ft. 3 in. diam. by 2 ft. 4 in. deep. 36 in. Copper Coating Pan (gas heated). No. 3 Kek Mill. 1½ size C. and N. Disintegrator. Roller Conveyor 14 in. wide by 8 in. pitch; ditto, 4 in. pitch. Unused Electric Agitators 400/3/50. Lehmann 4 pot conche. (30) "Z" Blade Mixers up to 42 in. by 28 in. by 38 in. "U" trough Jac. Mixer 6 ft. 3 in. by 2 ft. 3 in. by 2 ft. 7 in. 1,500 gall. Aluminium Cyl. Enc. Vert. Tank. Jac. Cyl. Mixers 20, 30, 40, up to 300 gall. Pans, Pumps, Hydros. Autoclaves, Ovens, Steam and Diesel Engines, etc.—Harry H. Gardam and Co. Ltd., Staines.

BETH Automatic All Round Can Labelling Machine, with electrically heated gum pot and A.C. motor drive. Perfect condition.—Details from Box B4766.

KELLIE type 4FP Automatic Jam Filling Machine with jar conveyor 9 ft. centres for 1 and 2 lb. jam jars. Complete with A.C. motor drive.—Details from Box B4767.

STEAM jacketed Steriliser or Vacuum, 3 ft. diam. by 7 ft. long, full swing door, jacketed, 30 lb. steam, full vacuum inside; ditto 4 ft. diam. by 8 ft. long; ditto 20 in. diam. by 3 ft. long, inside sizes. K.E.K. Grinding Mill, 18 in. diam. beaters, 15 h.p. motor, valves and fittings. "Johnson" wooden plate and frame Filter Press, 22 chambers, 39 in. by 22 in. by 2 in. thick, washing type. Stainless steel water jacketed Pasteurisers with mixing gear, 50- and 100-gall. Stainless steel Homogenisers by Brush, 150 gall. per hour and 75 gall. per hour, motorised, 440/3/50. Stainless steel Homogenisers by "Hurrell," 10 h.p. motor. "Premier" 5 in. Colloid Mill, 6 h.p. motor, 400/3/50. Stainless 50-gall. steam jacketed Tilting Pan. Stainless 60-gall. gas heated jacketed Boiling Pan. Stainless 60-gall. steam jacketed Boiling Pan. Three-speed Bowl Mixers, 4-, 8-, 30 and 60-quart. "Belhaven" Mixer Tilting Pan, 18 in. by 18 in. by 16 in. deep, double Z blades, 5 h.p. motor; ditto 29 in. by 28 in. by 22 in., gland packed bearings. Werner Mixer, jacketed pan, 29 in. by 29 in. by 28 in., double fin blades. "Gardner" Sifter Mixers, sizes D, F, E and G. Bowl choppers, Brandt capping machines, Peerless cutting machines, compressors and pumps.—Dartnall, 248, Humberstone Road, Plaistow, London, E.13.

GARDNER Combined Sifting and Mixing Machines: two size G, each with A.C. motor; one Gardner Rapid Mixer only, stainless steel lined, trough 40 in. by 15 in. by 15 in. deep; Gardner Experimental Mixer, size A; Gardner jacketed Dryer, size D, nearly new, trough 40 in. by 15 in. by 18 in. deep.—Frank Stacey and Co. Ltd., Vauxhall Street, Birmingham, 4.

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10 NEW Twin Roll Spray Driers, Escher-Wyss System, with chilled cast iron rolls, 40 in. long by 32 in. diam., for 60/80 lb./sq. in. w.p., fitted spray discs and air-cooled scrapers, also trough worm discharge conveyors. Main drive 7 h.p. A.C. motor through reduction gearbox. Drier complete with two motorised Air Blowers, motor driven 1½ in. diam. Stainless Steel Pump, jacketed feed tank approx. 45 in. by 37 in. by 26 in. deep, and motor-driven dresser for dried material comprising phosphor bronze mesh-covered screen, with spiral distributor to bagging-off outlet.

New Rotary Louvre Drier by Dunford and Elliott, 25 ft. long by 7ft. 6 in. diam. M.S. shell ¼ in. thick, M.S. radial louvres $\frac{5}{16}$ in. thick, stainless steel double tangential louvres ¼ in. thick and stainless steel feed cone. Inside of shell and both sides double louvres sprayed 0·002 in. zinc covered by 0·006 in. aluminium. Drum carried on two roller paths and driven through girth gear and pinion from worm reduction box and 15 h.p. motor. Inlet and Outlet Centrif. Fans, Exhaust Fan metal sprayed and inside of casing lithcoted.

6 New Vacuum Drying Ovens, M.S. welded constr. approx. 7 ft. long by 3 ft. 6 in. wide by 3 ft. 6 in. deep, fitted 9 steam heated shelves to carry 36 acid-resisting metal trays, 36 in. long by 16 in. wide by 1¾ in. deep. Davit swung door at each end. With motor-driven horiz. wet Vacuum Pump, pressure and vacuum gauges and connecting piping.

Vert. Twin-Cylinder Ammonia Compressor by L. Sterne, mark 2W.7¼, 7¼ in. bore by 6 in. stroke, single-stage, single-acting. Capacity 810,000 BTU'S elimination per hr. when evaporating at 45°F. Drive by 6 h.p. motor 400/3/50.

Vert. Twin-Cyl. Ammonia Compressor by L. Sterne, single-acting cylinders, 9 in. bore by 9 in. stroke. Output under standard operating conditions at 350 r.p.m. duty approx. 50 tons refrigeration; 12,000 BTU'S per tone; evaporating at 5°F. and condensing at 90°F. 80 h.p. required to drive.

Complete Ammonia Refrigerating Plant by L. Sterne, comprising Mark " 2 MAC " two-stage Ammonia Compressor, vee belt driven by 25 h.p. motor, with Shell and Tube Condenser, Ammonia Receiver, Shell and Tube Cooler, and accessories comprising Oil Separator, Float Valve, etc. Rated capacity 20 tons refrigeration at speed up to 550 r.p.m.

Vert. Cake Mixer by Peerless, 100 quart capacity, four-speed machine, with three bowls, beater, whisk, and hook. Direct drive by 5 h.p. motor.

Walmar Mark " V " Chocolate Enrober by Walter Denis-Contacts. Water jacketed chocolate bath fitted immersion heater and thermostat, 6 in. wide chain type conveyor in coating section. Air-operated rippler. Cooling section approx. 4 ft. 8 in. long mounted over 6 ft. centres flat belt conveyor fitted 6 in. wide canvas belt covered food grade rubber. Cooling supplied to tunnel from York Shipley self-contained Refrigeration Unit. Three motors and element suitable 230-240/1/50.

(*Continued in col. 2*)

SECOND-HAND PLANT FOR SALE

Rotary Moulding Machine by Baker Perkins, capacity 6 sacks per hour, complete with Langham power reduction unit but excluding motor.

Premier Paste Mill by Premier Colloid Mill, size 2½ in. Stainless steel contact surfaces. Underdriven from vert. spindle motor 230-250/1/50, 10,500 r.p.m.

Wine or Cordial Filtering and Filling Machine, gravity type, with Doulton grey thermal shock-resisting trough 3 ft. 6 in. by 1 ft. 3 in. by 12 in. deep. Ebonite tubing and Saunders valves and 3 felt hat filters. Twin head stainless steel spring-loaded filling nozzles mounted over trough.

2 Wine or Cordial Filling Machines, gravity type, with Doulton grey thermal shock-resisting containers 1 ft. 10 in. diam. by 2 ft. 9 in. deep. Twin head stainless steel spring-loaded filling nozzles mounted under containers.

2 Bowl Cutters by Barwin, direct electrically driven, 80 lb. capacity motorised 12½ h.p. 400/3/50.

New Stainless Steel Vessels and Storage Tanks, ranging from 8 gall. to 1,000 gall. capacity.

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TWO Autopack Weighing and Packing Machines up to 2 lb., £75 each. One Silkenburg Heat Exchanger, £50. One Apothecary Scales and Weights, £10. One brand new Creamery Package Multiflo Heat Exchanger, £550. One second-hand Creamery Package Mltiflo Heat Exchanger, £350. One 500 lb. Jahn Chocolate Kettle, £275. Homogenisers: One 400 g.p.h. Cherry Burrell, £400; one 100 g.p.h. Cherry Burrell, £275. One 200 g.p.h. Greamery Package, £250. One two-stage 200 g.p.h. Homogeniser by G. and J. Weir, with 12 h.p. motor and starter, £375. Stainless Steel Steam Heated Vats, by Creamery Package and Cherry Burrell, with motorised agitators: 100 gall. £225; 200 gall., £325., Stainless Steel Refrigerated Vats by Creamery Package and Cherry Burrell, 200 gall., £325; 100 gall., £200. Stainless Steel Block Cutters, from £30. Also, 5-gall. Insulated Churns, 55s. each; send for sample. Large stocks of Confectionery, Refrigeration and Ice Cream Plant; details on request.—Alfred's Ices (1954) Ltd., 3/5, Hall Place, London, W. 2. PADdington 6619/6610 (4 lines).

COPPER and Stainless Steel Jam Boiling Pans, BCH Blackcurrant Strigging Machine, motor driven, Stainless Steel Jam Bogies, Kellie Orange Peel Shredder, motor driven.—Clifford Coupe Ltd., 116, Canbury Park Road, Kingston-on-Thames.

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BROCKHOUSE 2-VS Gas-fired Steam Boiler, 144-lb. evaporation, automatic feed. Also 48 in. by 19 in. gas-fired Steam Boiler, 100-lb. pressure. Crypto " Moroil " Fat Extractor, 230-volt, 1-phase. Gravity Conveyors, Rollers 22 in., 18 in., and 14 in. wide on 6 in. and 4 in. centres, with curves. 25-gall. C.I. copper jacketed Steam Pan on three legs.—A. H. Kimmins and Sons Ltd., Lyndhurst Road, Worthing.

Powell & Co., 'Drum Master' Works, Burry Port, Carms.

SECOND-HAND PLANT WANTED

WANTED

- 1 Mather & Platt or Kellie Pea and Bean Filler.
- 1 Rotary, Steam, Pea and Bean Blancher.
- 1 Goose-neck Elevator, or
- 1 Combined Elevator - Blancher as above.

Details to

BOX B4753

MIXING Machine, trough size approx. 27 in. by 26½ in. by 20 in.; Buffalo, Anco or similar individual drive. Vacuum type preferred but would consider one suitable for conversion.—Reply Box B4755.

WANTED Quartering and Shredding Machine for Marmalade Manufacture. Lowest price.—Box B4756.

WANTED. Cream Depositor, Marshmallow Depositor with cocoanut sprinkler, also Ice Glazing Machine. Suitable for Biscuit factory. Preference given to Peters Machinery. Full particulars first letter.—Box B4757.

SECOND HAND Nut Roasting Machine. Capacity 1 cwt. Either gas or oil fuel. Redfern's Crisps.—Patrington, E. Yorks. Tel.: Patrington 318.

CANNER requires rotating Retort suitable processing milk products. Details including price.—Box B4768.

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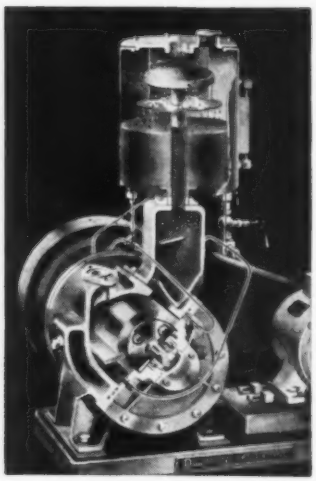

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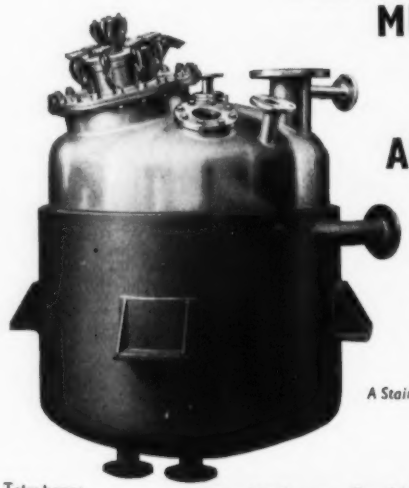

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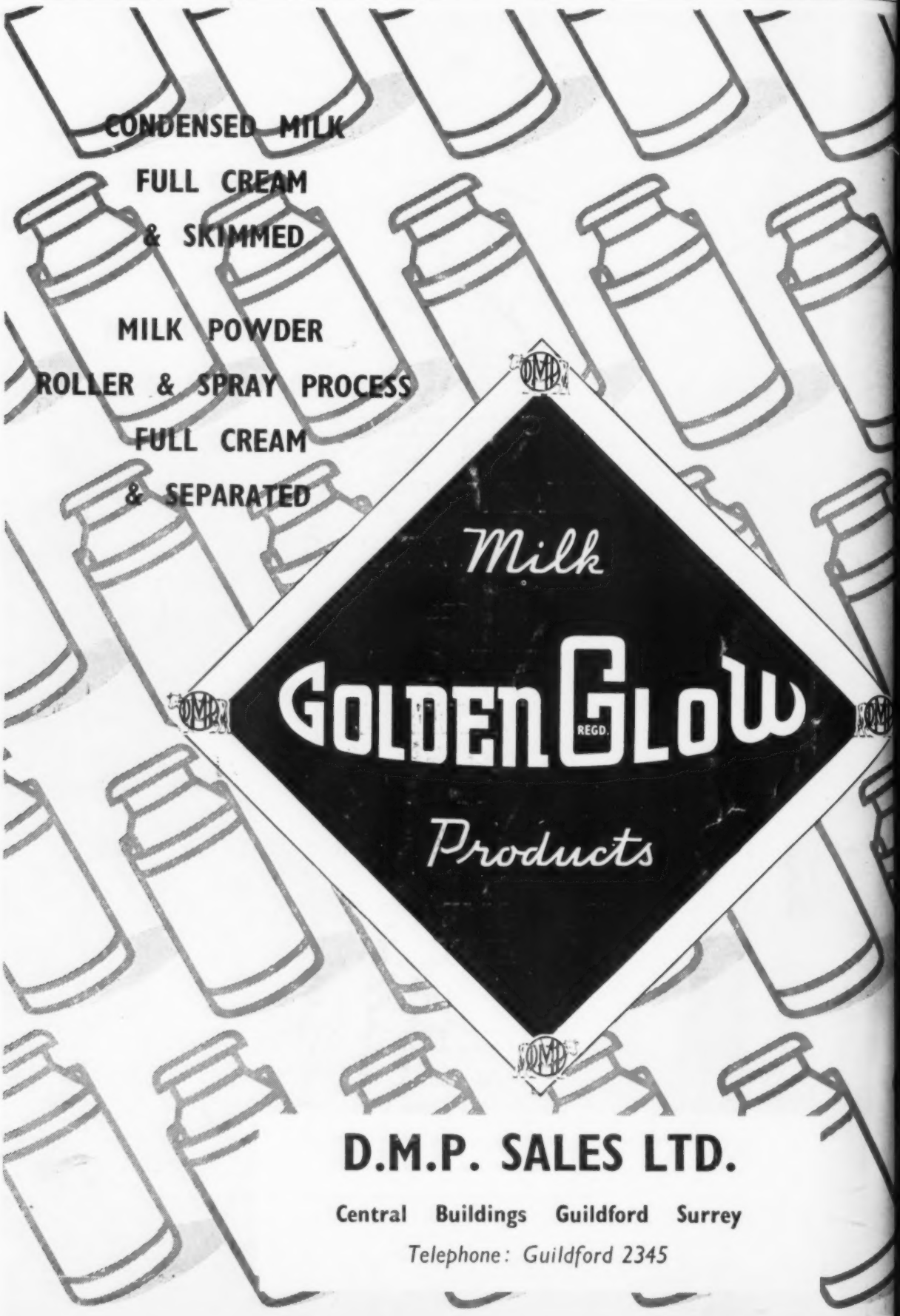

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